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Dudley
A paper on the
growth, trade and
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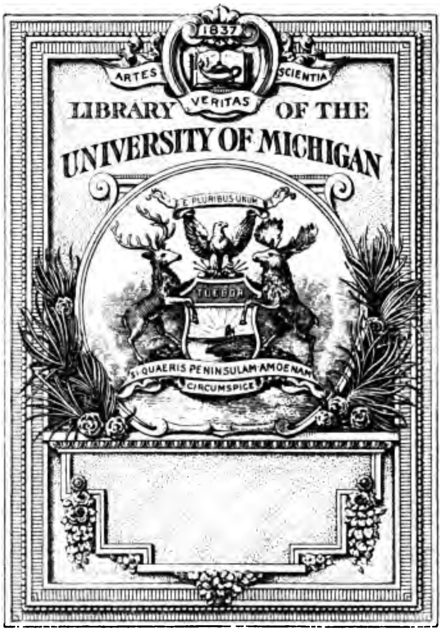
cotton.

University of Michigan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Meſsrs J. & P. Long
with respects of
J. G. Dudley

COTTON.

A PAPER

ON THE

Growth, Trade, and Manufacture

OF COTTON.

PREPARED AT THE REQUEST OF THE NEW YORK HISTORICAL SOCIETY, AND
READ BEFORE THEM AT THEIR REGULAR MEETING, MARCH 2, 1852.

BY J. G. DUDLEY.

PUBLISHED AT THE REQUEST OF THE
AMERICAN GEOGRAPHICAL AND STATISTICAL SOCIETY.

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Reclass. 11-22-29 A.V.M.

AT A MEETING OF THE EXECUTIVE COMMITTEE OF THE N. Y. HISTORICAL SOCIETY, JANUARY 20, 1852,

On motion of COL. WARNER, seconded by MR. MOORE, it was

Resolved, That MR. J. G. DUDLEY be invited to read a paper on the "HISTORY OF COTTON AND COTTON MANUFACTURES," at the regular meeting in March.

(Extract from the Minutes.)

GEO. H. MOORE, SECRETARY.

MARCH 2, 1852.

NEW YORK, JANUARY 7, 1853.

J. G. DUDLEY, Esq.

DEAR SIR:—Aware that, with much labor, you have compiled an interesting and valuable paper on the subject of the growth, manufacture, &c., of cotton, and desirous of preserving and presenting to the public the statistics which, with so much care you have prepared, we respectfully ask on behalf of the American Geographical and Statistical Society, of which we are the Publishing Committee, a copy of your paper to be printed in our next Bulletin.

Very respectfully,

FRANCIS L. HAWKS,
ARCH. RUSSELL,
J. LEAVITT,
Publishing Committee.

NEW YORK, JANUARY 10, 1853.

GENTLEMEN:—

Agreeably to the request which you have done me the honor to make, I submit to the American Geographical and Statistical Society, for publication in their Bulletin, a copy of the paper on the growth, manufacture and trade of cotton, read by me before the New York Historical Society in March last.

In doing this, I beg leave to do myself the justice to say, that it was prepared under the continued pressure of much business, *and without a view to publication*:—that I pretend to no originality of method or diction, having in many instances embodied my facts in the words with which others had clothed them. But for the facts themselves, I have diligently consulted the sources and authorities which were within my reach. Among these are—Herodotus; different encyclopedias; Hallam's History of the Middle Ages; McCulloch's Progress of Commerce; Dr. Ure; The New Library of Useful Knowledge; R. Burns's Statistics of the Cotton Trade; History of the Cotton Manufacture, by Bains; White's Memoir of Slater; Lowell as it Was and Is, by the Rev. H. A. Mills; the Life of Patrick T. Jackson, by J. H. Lowell, Esq.; Chapman's Cotton and Commerce of India; Hunt's Merchants' Magazine; De Bow; Gazetteer of New Jersey; Daniel Webster; the Public Documents of the United States; and many miscellaneous papers. I have also been favored with much valuable information on the subject, kindly furnished by several gentlemen well qualified to give it. Among these are Henry Lee, Esq., corresponding member of the New York Historical Society; J. Sargeant, Esq., Register U. S. Treasury; Hon. Charles T. James, Rev. Wm. J. Breed, P. T. Jackson, Esq., son of the late P. T. Jackson, founder of Lowell; J. D. Prince, John Colt, R. L. Hawes, W. C. Chapin, William Mason, Charles Danforth, Wm. B. Leonard, and John C. Whitin, Esqrs., to whom I take this opportunity to tender my most grateful acknowledgments. I believe that whatever I have ventured to state has the sanction of the most accurate authorities, and may be relied upon by those who feel an interest in the subject.

Very respectfully,
Your obedient servant,
J. G. DUDLEY.

To

Francis L. Hawks,
Archd. Russell,
J. Leavitt,
Publishing Committee.

COTTON.

Mr. President and Gentlemen of the New York Historical Society:—

It is a just remark of a modern writer, who has veiled his name in the mantle of his modesty, "That of the *true history* of mankind, only a few chapters have yet been written."

The physical wants of man in a civilized state, exceed altogether his individual powers of supply. Hence he is of necessity a *social being;* and his wants and his desires are in a great measure dependent for their attainment upon his fellow men, and inseparably connected with correlative duties to them. *This is human destiny.* It would seem, therefore, that whatever tends to the advancement of our race, and the amelioration of its condition, is a part of "the true history of mankind," and ought to be written. And that those persons who by their labors and exertions, whether mental or physical, have done the most to that end, are justly entitled to the highest niche in the temple of human glory. Yet how different has been the experience of past ages! While the deeds of the warrior, who rode forth to pillage and destroy, have been blazoned to the world in history and monument and song, the *true heroes* in the cause of humanity, the *patient inventors*, the *great captains of industry*, and promoters of the *arts of peace*, together with their labors, have been too often suffered by the historian to sink into oblivion. Fortunately for our race, a new era has dawned upon us. Men have begun to perceive that the arts of peace are the true sources of national strength, as well as of individual prosperity; that the proper duty of the historian and poet is to celebrate and record the deeds of those who have done the most to increase human comfort and happiness, rather than of those who by battle and conquest have been instrumental in destroying both; *that he who invents a machine which lessens human toil and increases human comfort, is a greater benefactor to his race* than he who simply inherits a crown, or receives the applause of the world for splendid military achievements. In the development of the uses to which some of the simple vegetable productions of our own country are now applied, new sources of invention, of beauty and art, of profitable industry, of individual comfort, of private and national wealth, have opened themselves to our view, altogether astonishing in their magnitude and effects upon the commerce and happiness of the world.

Of these, perhaps none afford a better illustration of the importance and magnitude of the blessings which God has conferred upon us through his vegetable kingdom, than the simple COTTON PLANT, which, by your invitation, I make the subject of my essay this evening.

The early history of the cultivation and manufacture of cotton, is involved in much obscurity. The shrub or plant which produces it, of which there are several varieties, has been found growing spontaneously or successfully cultivated, in nearly all the countries of the globe, situated between 40 degrees North, and about 33 South latitude. In "the Crimea" it is grown as far North as 43 degrees of latitude, and under the torrid zone in South America, on mountains 4,000 feet elevation above the level of the sea.

It is said to be mentioned but four or five times by the early Greek and Latin authors, and is not alluded to in the Bible. The first mention of it in history is by Herodotus, in his description of the usages of the people of India. Among other remarkable things which he describes, he relates "that the people of that country possess a kind of plant, which instead of fruit, produces wool, of a finer and better quality than that of sheep, and that of this they make their clothes."

The cultivation and manufacture of cotton began in India long before the date of authentic history. At the commencement of the Christian era, they had extended to Persia and Egypt.* It had also begun to be

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* In the time of Pliny, A. D. 50, the cotton plant had come to be extensively known. He often mentions it. In his Natural History the following passage occurs:—"In Upper Egypt, towards Arabia, there grows a shrub which some call gossypium, and others Xylon, from which the fabrics are made which we call *Xylena.* It is small, and bears a fruit resembling the filbert, within which is a downy wool that is spun into thread. There is nothing to be compared to these stuffs for whiteness and softness; beautiful robes are made from them for the priests of the land."

Mr. John Chapman, in his work recently published on the "Cotton and Commerce of India," says:—"The cotton fibre is the fruit of plants of different forms and magnitudes, from an annual creeper to a tree twenty feet in height: only the kinds produced by annual, triennial, and perennial bushes are used for woven manufactures. * * * * The kind commonly, and perhaps from ancient times, produced and used in India, differs from the sorts obused in Rome. As early as 63 years before Christ, Lentullus made use of cotton cloth as an awning for the theater; and frequent mention is made of it by the writers of that and later periods.

The commercial activity of the early followers of Mahomet widely spread its use in their day.* Science and every kind of industry were carried to greater perfection in Spain, under the dominion of the Moors, than they attained at that period in any other part of Europe; and the manufacture of cotton into various and beautiful fabrics flourished in that country under their dominion; yet the mutual repugnance existing between the Mahometans and Christians, was doubtless the cause that prevented its spreading to other parts of Europe.

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tained in other countries, and seems even from the days of Arkwright to have been held in inferior estimation in England, although its substantial good qualities give it a decided preference with the natives, who use it."

Not many years since, one traveler (Mr. John Duncan), found a variety of the plant in Abomey, Africa, which produced a very superior cotton. The stocks of the plants were fourteen feet high, with large branching heads.

E. H. Hopkins, Esq., our present consul for Paraguay, informs us, that upon the alluvial banks of the large streams of that country, cotton of superior quality is grown, and that in the forests are found two kinds of wild cotton, admirably adapted to the manufacture of paper.

* It is stated upon good authority, that Omar, the immediate successor of Mahomet, preached in a tattered gown of *cotton*, torn in twelve places. Another evidence that it was common in Mahometan countries, may be seen in the observation of two Arabian travelers who visited China in the ninth century. They remarked, "that the Chinese chiefly used silk stuffs for their garments, instead of cotton, *as the Arabs did.*"

It is also stated by William de Rubruquis, who was Ambassador from the French King to several oriental courts in 1252, that cottons were then articles both of trade and costume in the Crimea, and southern Russia; being brought from Turkistan, and that they were worn to some extent in the provinces of Tartary.

In the fourteenth century the manufacture of cotton had been carried to great perfection in Granada. Abu Alkhatib, the Spanish Arabic historian of that kingdom, affirms that cotton garments made there were said to be far superior in delicacy and beauty to those of Assyria.

But when after years of bloody warfare, Granada, the last stronghold of Moslemism, fell before Ferdinand, science also fell, the arts were lost, and "Woe is me, Alhama," was truly a more significant sigh than the heart-broken words express. Barcelona, however, continued the manufacture. In 1560, fustians were made in great quantities at Bruges and Ghent. Antwerp at this period imported fustians from Venice, and also many finer qualities of fustians and dimities from Milan. In Italy, Germany and Flanders, the manufacture had but a lingering and ignoble existence; and indeed it was not then carried to any degree of perfection anywhere in Europe.

Paper was first made of cotton by the Chinese, and a knowledge of this art was brought from them into Europe by the Saracens. Although the plant had been long known in China, yet cotton cloth was rarely manufactured by that people until after the conquest of their country by the Tartars; but as early as 1368, its use prevailed throughout that empire.

The precise date when this manufacture commenced in England, is not known. From an entry in the books of Bolton Abbey, 1298, it is stated that "cotton was used for candle-wicks;" but no advance was probably made during the three succeeding centuries of war, ignorance, and confusion.

In an old work entitled the "Process of English Policy," the author says, "Genoa resorts to England in her huge ships, called Carracks, bringing many commodities, as silk, paper, wool, oil, COTTON, &c." This was near the close of the fifteenth century.

England from that period had her cotton from

Cyprus, Smyrna, and other countries bordering on the Mediterranean, until the establishment of her great East India and American trade.

Woolen goods had long been manufactured in England, when in 1585, on the capture of Antwerp by the Duke of Parma, large numbers of Protestant artisans fled from the cities of the Spanish Netherlands, and took refuge in England, bringing with them the art of manufacturing cotton: some of them settled in Manchester, and were encouraged by the warden and fellows of the College of that town.*

Down to the year 1530, no essential improvement had been made in the machinery for spinning and weaving, beyond the ancient distaff and spindle, and primitive loom. In this year, the common one-thread spinning wheel was invented at Brunswick, in Germany. The "weaver's," or "Dutch loom," was brought into use in London, from Holland, about the year 1676. It was similar in construction to our common hand-loom. We have no record of the invention of the primitive loom, nor by whom it was brought to this stage of improvement.

Columbus found cotton growing wild and in great abundance in Hispaniola, and other West India islands. And the splendid stuffs sent by Cortez to Spain after his conquest of Mexico, is satisfactory evidence of the high state of perfection to which the

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* "At so late a period as the year 1331, weaving was so little understood in England, that the arrival of two weavers from Brabant is recorded as among the important events of the time. But it was the religious persecutions of the Duke of Alva which first gave importance to the manufacture of cloth in England, by driving crowds of Flemish weavers to seek a home in that country. Louis the XIV., by his revocation of the edict of Nantz in 1686, caused the expulsion from France into England, of about 50,000 of the best French manufacturers."—Ure.

Mexicans had carried the art of manufacturing. Yet they had made no advances in machinery beyond the distaff, spindle and primitive loom.*

In 1641, a little English work, called the "Treasure of Traffic," notices the new art, as if it had then become well established at Manchester; supplying not only the market at home, but also those of the Levant, in exchange for the raw material. Still, *linen* yarn was used for the warp of fustians and nearly all other cotton goods, down to the year 1773. Rudeness of machinery prevented the production of fine yarns or fine fabrics. Dimities were woven, but no calicos were attempted.

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* "There is no doubt that in Greece, Troy, Tyre and Sidon, the arts of weaving, dying and embroidery, had been carried to a high degree of perfection at the time of the Trojan war.

"The Indian loom was probably the same four thousand years ago as now. It was simple and rude in its construction. The mode of operating the ancient loom differed among different nations. Herodotus says:—'The Egyptians shoot the woof beneath, and other nations above.' This proves that they operated their looms differently, but I do not clearly understand his meaning. The Hindoo loom is thus described by modern writers:—'It consists merely of two bamboo rollers, one for the warp and the other for the web, and a pair of geer. The shuttle performs the double office of shuttle and lathe, and for this purpose, is made like a large netting-needle, generally of a length somewhat exceeding the breadth of the piece. This apparatus the weaver carries to a tree, under which he digs a hole large enough to contain his legs and the lower part of the geer. He then stretches his warp by fastening his bamboo rollers at a due distance from each other on the turf by wooden pins. The balances of the geer he fastens to some convenient branch of the tree over his head, two loops underneath the geer, in which he inserts his great toes, serve instead of treadles, and his long shuttle draws the weft through the warp, and afterwards strikes it up close to the web. The reed used by them is like our own, and well made."

In the old pictures of the Aztec machinery that have been discovered, neither the shuttle nor distaff have been found represented, and these were probably not attained by that people. According to the accounts of modern travelers, the Aztec loom was a very rude instrument, consisting merely of four stakes driven into the ground, upon which the web was stretched; no shuttle was employed by them, but in place of it a long wooden needle; no attempts, it would seem, were made by them to render their implements more efficient. The modern Peruvians spin without the distaff, and their loom is like the one just described. Every piece of cloth was woven the precise width wanted for a garment. Specimens of the cloth have been found in their tombs.

Towards the close of the seventeenth century, a great increase of the manufactures and trade of England took place.

During the period of almost uninterrupted peace between 1720 and 1740, the commercial towns, and especially Manchester, made rapid strides in wealth, population, and manufacturing operations; the grand staple being cotton in all its varieties.

At this time the demand for yarn exceeded the supply, and the weaver was continually pressing on the spinner. The Manchester merchants began to give out linen warps and raw cotton to the weavers, receiving them back in cloth, paying for the carding, roving, spinning and weaving. When finished, the cloth was dyed by the merchants, and then carried by them to the principal towns on packhorses, to be retailed to shopkeepers along their route.

The great expense necessarily incurred in converting cotton into yarn on the single thread wheel, and the small quantity that could be produced in a given time, formed a great obstacle to the increase of the new manufacture.

In 1738 Mr. John Kay, a native of Bury, in Lancashire, and a resident then of Colchester, invented the "Fly Shuttle" which is still in use. By this new invention, the shuttle was driven across the warp and back again without being thrown by the workman's hands.

By this means the weaver was enabled to make nearly double the quantity of cloth, and, besides, *one man could weave the widest web.*

About this time Mr. John Wyatt of Litchfield or Birmingham invented a machine for spinning cotton *by rollers*, and two factories were established employing his machinery, one at Birmingham and the other at Northampton. Both the undertakings, however, failed; and the machines were long since lost, no models of them remaining now in existence.

The patent for this machine was taken out in 1738, in the name of Lewis Paul, a Swede, who was connected with Wyatt in business.

Paul took out another patent for spinning by rollers in 1753. It is highly probable the machine was the same as the machine of 1738, but included a supposed improvement in the mode of applying the sliver of cotton to the rollers, consequent upon his improvement in the carding process hereafter to be described.

No other attempts to spin by machinery are known to have been made till 1764.

The fly shuttle also of Mr. Kay was not brought into general use until 1760; when his son Robert invented the *drop box*, which enabled the weaver to use any one of three shuttles containing different colors without removing and replacing them in the lathe. These inventions excited the envy and hatred of the ignorant weavers of Lancashire, and were so maliciously opposed by them, that Mr. Kay left the country, taking up his residence in Paris.

The numerous and remarkable inventions which were made soon after this period, are differently recorded by different authors. Having examined many conflicting accounts, I believe the following to be their correct history:

The first spinning machine produced after the failure of Wyatt's, was contrived by Thomas Highs, assisted by a Mr. Kay, clock maker of Leigh, in Lancashire, and named for his daughter Jane, "*The Spinning Jenny.*" It was, however, an imperfect machine, wanting many parts essential to its success. Highs afterwards produced a double Jenny with some new apparatus, for which he received a present of 200 guineas from the manufacturers of Manchester. But it does not rest on any conclusive evidence that he was an original inventor. He continued to make Jennies, mostly on his own plan; till he was disabled by a stroke of palsy, about 1790.

The great demand for yarn, which the one-thread wheel could not supply, made many persons endeavor to contrive a substitute for the imperfect hand machine.

A "Society for the Encouragement of Arts, Manufactures, and Commerce," was established at Manchester, England, in 1754. In the nine years succeeding, six model machines had been presented for approbation, and the society had distributed £544 12s. in premiums for improving several machines used in manufactures, viz: the comb-pot, cards for wool and cotton, stocking frame, loom, machines for winding and doubling, and *spinning wheels.*

In the transactions of the Society in 1783, it is said by the compiler: "From the best information hitherto obtained, it appears that about the year 1764 a poor man, of the name of HARGREAVES, employed in the cotton manufactory near Blackburn in Lancashire, first made a machine in that county which spun eleven threads, and that in the year 1770 he obtained a patent for his invention. The construction of this kind of machine, called a Spinning Jenny, has since been much improved, and is now at so high a degree of perfection, that one woman is thereby enabled with ease to spin a hundred threads of cotton at a time." JAMES HARGREAVES, a weaver of Standhill, near Blackburn, was the author of the above invention, the date of which has however been supposed 1767. This invention of Hargreaves showed high *mechanical genius*; and, differing completely from any machines that had been produced before, *there can be no doubt of its originality.*

The inventor is said to have received his first idea of it from observing that a one-thread wheel having been overturned upon the floor, both the wheel and spindle continued to revolve. Hence, it occurred to his mind, that if a number of spindles were placed upright and side by side, several threads might be spun at once.

This invention of Hargreaves, thus suggested to his mind by an awkward accident, was the first efficient advance from the common one-thread spinning wheel, and may justly be regarded as the prototype of all the wonderful improvements in the art of spinning, which have since been made. This machine he first kept as secret as possible, confining it solely to the yarn which his family spun for his own weaving. At length it became known, and the spinners raised a cry against it, alleging it would throw multitudes out of employment. A mob broke into Hargreaves' house and destroyed the machine: not only this, but the persecution he suffered, and the danger in which he was placed, obliged him to leave his native county, as the inventor of the "fly shuttle" had been compelled to do before him. He retired to Nottingham in 1768, where, in partnership with Mr. Thomas James, a joiner, he erected a small mill. Before he left Lancashire, he had made a few jennies for sale; but although the manufacturers and weavers fully appreciated and encouraged their use, a desperate effort was made by a mob in 1779, to put down the machine. Not only the jennies but all the machines turned by water or horses, were destroyed for several miles around Blackburn; those jennies only were spared which contained but twenty spindles, these being admitted by the mob to be useful. Hargreaves died at Nottingham in 1778, having maintained his family in comfort by the fruits of his invention.

The inventions and improvements I have described, were, however, but the first dawnings of a new era in the history of mechanical contrivances. The idea of a complete system of manufacturing with the aid of labor-saving machinery, had not yet been conceived by the mind of man. It was reserved for RICHARD ARKWRIGHT to introduce and establish a system which has placed England in wealth and commercial greatness at the head of the nations,—*which has materially affected the destinies of our own country, and changed the commerce of the world.*

RICHARD ARKWRIGHT was one of those great characters whom nature seems to have destined, by the endowment of superior powers, to be the benefactor of their fellow-men. He was born at Preston, in Lancashire, the 23d of December, 1732, of poor parents: being the youngest of thirteen children, his parents could only afford to give him an education of the humblest kind, and he was scarcely able to write. He was brought up to the trade of a barber at Kirkham and Preston, and established himself in that business at Bolton, in the year 1760. Having discovered or become possessed of a chemical process for dying human hair, which in that day was of considerable value, he traveled about collecting hair, and again disposing of it when dyed.

In 1761 he married a wife from Leigh; and the connections he thus formed in that town are supposed to have afterwards brought him acquainted with High's experiments for making spinning machines. He manifested a strong predilection for mechanics, which he is stated to have followed with so much perseverance, as to have neglected his business and injured his circumstances. His natural disposition was ardent, enterprising, and stubbornly persevering. In 1767, being then 35 years of age, he fell in with "Kay, the clockmaker," at Warrington, whom he employed in relation to some of his mechanical experiments; and it is said he was then endeavoring to produce a perpetual motion. The result of this acquaintance was, that Arkwright devoted himself to a more useful and practicable scheme, and having engaged Kay to work for him in those details which he was not himself skilled in, *he began the construction of his spinning machine.* He had many difficulties to contend with; Kay was unable to make all the machinery required; but Mr. Peter Atherton lent Kay a smith and watch-tool maker, to make the heavier part of the machine, and Kay undertook the clockmaker's part of it, and to instruct the workmen. *Thus was Arkwright's first spinning frame made.*

Still, poverty did not allow him to prosecute his invention; and he repaired to his native place, where he interested a friend, Mr. Smalley, in his behalf; and his machine was fitted up in the parlor of the house belonging to the "Free Grammar School," which was lent by the head master to Mr. Smalley for the purpose.

Riots had taken place in the neighborhood of Blackburn on the invention of Hargreaves' spinning jenny, as before noticed; and Arkwright, fearing similar outrages against his machine, left Preston, accompanied by Mr. Smalley and Kay, and went to Nottingham.

They first applied for pecuniary aid to Messrs. Wright, bankers, but by them they were referred to Mr. Need, who, with his partner, Mr. Strutt, the improver of the stocking frame, joined Arkwright in partnership. *The machine was made practicable; and in* 1769 *he out took a patent*, describing himself, in his application for it, as Richard Arkwright, *Clockmaker.*

He and his partners erected a mill at Nottingham, which was driven by horses; but this mode of turning the machinery being found too expensive, they built another mill at Cromford, in Derbyshire, on a much larger scale, which was turned by a water wheel, and hence the spinning machine was called the "*Water Frame.*"

By the two important inventions of which I have traced the history, the cotton manufacture was freed from those obstacles which had hitherto retarded it. The yarn turned off by the new machines was in greater quantity and superior quality; and the hard, firm thread spun by the "*water frame*" being found suitable for warps, linen yarn was abandoned for that purpose, *and goods were for the first time in England, woven wholly of cotton.* More delicate fabrics were also introduced—especially calicoes, in imitation of the Indian. The jenny was peculiarly adapted for spinning filling, so the two machines aided each other.

Arkwright had to encounter much animosity and uncertainty at the beginning of his career. It was not until upwards of five years had elapsed after obtaining his patent, and more than sixty thousand dollars had been expended in machinery and buildings, that any profit accrued to himself and partners.

The Lancashire manufacturers refused to buy his yarns, and he and his partners found themselves encumbered with a heavy and valuable stock. They were driven to attempt the manufacture of this for themselves, first in stockings, which succeeded; and then in calicoes, which succeeded also. Another still more formidable difficulty arose; the orders for goods which they had received being considerable, were unexpectedly countermanded; the officers of the excise refusing to let them pass at the usual duty of 3d. per yard, insisting on the additional duty of 3d. per yard as being calicoes, though manufactured in England.

By this unforeseen obstruction a very considerable stock of calicoes accumulated. The proprietors, therefore, had no resource but to ask relief of the Legislature; which, after much money expended, and against a strong opposition of the manufacturers in Lancashire, they obtained.

This was the first Legislative acknowledgment of the existence of a British manufacture consisting wholly of cotton, and was in 1774.

The cotton machinery was still very imperfect, especially in the preparation; and the process of *carding* was the next subject for improvement. This was done with hand cards, which were made about 12 inches long and 5 wide: the cotton being spread upon one of the cards, it was repeatedly combed with the other till all the fibres were laid straight, when it was stripped off the card in a fleecy roll, ready for the rover. The first improvement was in making one of the two cards a fixture, and increasing its size, enabling one workman to do double the quantity of work; and this was rendered still more easy by suspending the movable card by a pulley from the ceiling, with a weight to balance it, so that the workman had only to move the card without sustaining its weight. These "stock cards," as they were called, had been used in the woolen manufacture, *but they were applied to cotton*, by Hargreaves, in 1760. The grand improvement in carding (as in fact in all other machinery) was the application of *rotary motion;* and this we owe to Lewis Paul, before mentioned, who took out a patent for his machine in 1748. This invention was admirable, but it had defects: the cotton was put on and taken off by hand, requiring the stoppage of the machine; and the perpetual carding was also done by the hand; joining short lengths together. These defects were remedied by a *feeder*, which was invented by JOHN LEES, of Manchester in 1772; and a continuous fleece was produced by the contrivance of Messrs. Wood and Pilkington.

In 1775 also, Arkwright took out a patent for a carding machine containing many improvements; the patent also included machines for drawing and roving. Cylinder cards were invented about 1762, and were first used by Robert Peel, ancestor of the late distinguished prime minister of England. Carding was not perfected, however, until 1775, the date of Arkwright's patent. The machines just mentioned as patented by Arkwright, are very important; and good yarn could not be spun by machinery without them. The machines have been greatly improved since, and some others introduced; but Arkwright was the first to introduce the *drawing process*, and to apply the spinning rollers to the purpose of *roving*, *and very great merit belongs to him on that account.*

But there are three machines I have not mentioned, which are used previous to the operation of carding, equally useful with the important inventions I have described, in forming a complete series of machinery adapted to the manufacture of cotton. From the very hard pressure to which cotton is subjected in packing, it is in matted lumps, mixed with more or less of dirt, leaf, &c. The first process to remedy this is by means of a machine called a "Willow." This name is derived from a machine which had been formerly used in Normandy for cleaning cotton and probably sheep's wool. It was a cylindrical cage made of *willows*, with a rotary axis and cross arms. The machine used now is entirely different, but it retains the name. After passing through this machine, the cotton was taken to what was then called the *scutching machine*, in which it was beaten by metallic blades revolving on an axis with great rapidity. This machine was introduced into Manchester about 1808. Before the invention of it, the cotton was opened and cleaned by being placed upon cords stretched on a wooden frame, and then beaten by women with smooth switches. The third machine is the spreading or lapping machine, constructed and brought into use by Messrs. Arkwright and Strutt.

They had thus perfected a *complete series of machines*, which were capable, at a small cost and without *the aid of human strength* (except carrying the material from one machine to another), of performing all the operations which were requisite and necessary for converting the "*Vegetable Wool*," which excited so much the admiration of the "*Venerable Father of History*," into yarns ready for the weaver's use. *These inventions commenced with Wyatt and Paul in* 1733, *and were the joint results of many profound minds directed to the same object; but the merit of combining them all to form a perfect whole, belongs to* RICHARD ARKWRIGHT, the poor barber of Preston.

When this admirable series of machines became known, Arkwright's fame resounded in all quarters, and his machines were eagerly sought and used. The consequence was an unlimited supply of yarn to the weaver, cotton warps at a lower price than linen, cotton fabrics at very reduced prices, and consequently a great demand, *and high wages to the weavers;* spinning mills were erected upon a large scale by Arkwright and others, *and a mighty impulse was given to the cotton manufacture.*

*The factory system in England, as applied to cotton, takes its rise from this period.** Hitherto, the various operations being performed separately, had been carried on entirely in the houses of the workmen, or adjacent workshops. But the machines of Arkwright required more space than the dwellings of the workmen could afford, and more power than could be given by the human arm; their weight also was great. These circumstances, added to the consideration of waste, and the necessity for water power (*the only motor then known*), led to the erection of mills, in which every separate process might be carried on without the waste and trouble of moving the material from house to house.

Meanwhile, Arkwright's success and the wealth that rapidly flowed in upon him, roused the jealousy of other manufacturers, and several persons set up machines similar to his without his license, on the plea that he was not really the author of these inventions. To vindicate his claim he instituted actions, which were defended by an association of Lancashire manufacturers. Only one action came to trial, and a verdict was given for the defendant, thus setting aside his patent. In another attempt to establish his second patent, Arkwright gained a verdict. But the Lancashire manufacturers obtained a writ from the Lord Chancellor to try *the validity of the patent.* The cause was ably argued, models exhibited, and numerous witnesses examined; *a strong case was made out against him, and the patent was set aside. Thus were his machines thrown open to the public, and an astonishing extension of the manufacture immediately ensued.*

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* "From Homer we learn that embroidery and tapestry were prominent arts with the Thebans, that poet deriving many of his pictures of domestic life from the paintings which have been found to ornament their palaces. Thus, it is evident that some of the proudest attainments of art in our own day, date their origin from a period coeval at least with the Iliad. Again, we find that the use of the distaff and spindle, referred to in the Sacred Scriptures, was almost as well understood in Egypt as it now is in India; while the *factory system,* so far from being a *modern invention,* was in full operation, and conducted under patrician influence, some three thousand years ago."—[*Pastoral Life and Manufactures of the Ancients.*]

It would consume too much time to follow the personal history of *this extraordinary man;* but his life is well worth studying, for the example which it affords of unwearied ardor and industry, even after fortune had poured her golden store so amply upon him. He endeavored at fifty years of age to remedy the defects of his early education; and his economy of time was a marked feature in his character to the last moment.

In 1786 he was appointed high sheriff of Derbyshire, and soon after received the honor of Knighthood, from George the Third. He died at Cromford on the 3rd of August, 1792. in the sixtieth year of his age. He left an immense estate, and his descendants are now among the wealthiest of the commoners of England.

But Hargreaves' and Arkwright's machines were not adapted to the finer qualities of yarn. This defect was remedied by the invention of another machine, which was named the *Mule*, from its combining the principles of Arkwright's water frame and Hargreaves' jenny. This admirable invention, *which has entirely superseded the jenny*, and to some extent the water frame, was contrived by SAMUEL CROMPTON, a weaver of respectable character and moderate circumstances, living at "Hall-in-the-Wood" near Bolton. He was but 21 years of age when he commenced his undertaking, and was five years in bringing it to maturity, which was accomplished in 1779. In his account of his invention he said, "he had no other end in view than having good yarn to weave." The unambitious man took out no patent, "desiring merely to enjoy," what he termed "his little invention, in his own garret." The very superior quality of his yarn, however, raised public curiosity as to the method by which it was produced, and persons came to him from all quarters to inquire respecting it.

Thus, the machine became known, and was turned to advantage by more energetic manufacturers, while the modest inventor received no other recompense than the very inadequate one of £5,000 granted him by parliament in 1812. The first mule made by Crompton was rude and heavy; but an ingenious mechanic, Henry Stones of Horwich, who had doubtless seen Arkwright's machine, constructed a mule in a workmanlike manner, making the rollers of metal, and applying clock work to move them; and adapting it to three times the number of spindles Crompton had used. Other persons made other improvements; and in 1790, *the mule was first turned by water power, by* MR. KELLY *of Lanark Mills.*

The superior quality of yarn produced by the mule, created a great demand for laborers to operate it, and consequently a much higher rate of wages than was paid to artisans in general. This led to frequent combinations for higher wages on the part of workmen who were capable of operating the machines, which naturally led to an anxious desire on the part of the proprietors of cotton mills, that some means should be devised to enable them to dispense with the labor of the spinners.

Various attempts, running through a period of twenty or twenty-five years, were made by different mechanicians. The only persons who succeeded beyond the purposes of experiment, were, Messrs. Eaton, De Jough, Buchanan, Brewster, Roberts, and Knowles. But these were generally unsuccessful, from defects in the adjustment of the machinery and various other causes. James Smith of Scotland invented a self-acting mule which operated successfully, and which was introduced and patented in this country, as I shall hereafter describe when I come to speak of the United States.

But the machine which has met with decided success is the "*self-acting mule*," invented by Mr. Roberts of the firm of Sharp, Roberts & Co., of Manchester, which is now in extensive use in England and has been introduced into the United States. Mr. Roberts took out his first patent in 1825; and a second, for a further improvement, in 1830. A description of this extraordinary and intricate machine cannot be given without diagrams. Many improvements have also been made in the different machines used by Arkwright, which it would take too much time to name; among others, is the throstle frame, the ring spinner, and Danforth's cap spinner, which have taken the place of Arkwright's water frame. This brings the invention of spinning machinery to about 1833; since which time *our own coun-*

try has furnished more improvements than any other, and has imparted more than it has received.

Such rapid progress in the spinning department of the cotton manufacture, demanded a correspondent improvement in that of weaving. A loom moved by water power had been contrived by M. De Gennes, in the 17th century, but it is not known to have come into use. About the middle of the 18th century a swivel loom was invented by M. Vauconson; and in 1765, a weaving factory, probably filled with these looms, was erected by Mr. Gartside of Manchester; but no advantage was realized, as a man was required to superintend each loom.

In 1785, the Rev. *Dr. Edmund Cartwright* invented a power loom, which may be regarded as the parent of that now in use. His first attempt, by his own description, was an awkward affair. He says, "The warp was placed perpendicularly, the reed fell with at least four hundred pounds weight, and the springs which threw the shuttle were strong enough *to have thrown a Congreve Rocket.*" It required the strength of two powerful men to work the machine at a slow rate, and only for a short time. He, however, made improvements, and took out another patent, the 1st of August, 1787, but was unfortunate in a weaving factory, which he established for weaving with power looms. He, however, received £10,000 from parliament as a reward for his ingenuity.

After the failure of his first factory, another establishment, containing 500 looms, built at Manchester, was destroyed by an exasperated mob, in 1790, under the delusive idea that the introduction of weaving machines would do away with the demand for their labor, and destroy their means of subsistence. The invention, nevertheless, was improved by others, and surmounted all opposition. At the time of Cartwright's death, in 1824, it was stated that *power looms* had increased so rapidly in England, that they were then performing the labor of *two hundred thousand men.*

In 1794, a power loom was invented by Mr. Bell of Glasgow, but it was abandoned. In 1796, Mr. Robert Miller of Glasgow also took out a patent for a machine of this nature; which was adopted in 1801, by John Monteith of Glasgow, who fitted up a mill with 200 looms. It was several years, however, before the business was made to answer.

But it was not till MR. HORROCKS, of Stockport, in 1803, after a long career of costly experiments, introduced some very important modifications into the power loom, that it became effective; but unfortunately omitting certain minutiæ in the construction, which interfered with its uniformity of performance, he did not receive the reward which was due to his talents and ingenuity. But his loom is essentially the one now in use. It was perfected by Messrs. Sharp and Roberts.

The great obstacle to the success of the power loom was, that it was necessary frequently to stop the machine, in order to dress or size the warp as it unrolled from the beam. This difficulty was removed by the invention of a machine for dressing the warp before it was placed in the loom. This *beautiful and valuable* machine, was invented by Messrs. Radcliffe & Ross, of Stockport, assisted by a workman of the name of

Thomas Johnson. They spent two years in experimenting before the machine was produced. They obtained a patent for it in 1802. Passing over many valuable inventions for manufacturing cotton—not the least of which is the stocking frame for weaving hosiery, invented by *Wm. Lee*, of Nottinghamshire, in 1589, and greatly improved by *David Holt*, and afterwards by that accomplished man, JEDEDIAH STRUTT, who first wove *ribbed* stockings, in 1756—and also the contrivances of machines for weaving lace, I will describe very briefly the improvements in bleaching and the introduction of calico printing.

Bleaching by the action of the sun and atmosphere is the most ancient, and still the common method in many countries. But this process is too slow to suit the modern demands of manufacturers. The bleaching process, as performed in the middle of the last century, occupied from six to eight months. "It consisted," says the "Encyclopædia Britannica," "in steeping the cloth in alkaline lyes for several days, washing it clean, and spreading it on the grass for some weeks: this operation was repeated five or six times. The cloth was then steeped for some days in sour milk, washed clean, and dried. The processes were repeated, diminishing every time the strength of the akaline lyes, till the cloth had acquired the requisite whiteness." In the last century the art of bleaching was so little understood in Great Britain, that nearly all the linens made in Scotland were sent to Holland to bleach. From this came the name of "Hollands," as applied to this species of British manufacture.

The first great improvement in bleaching in Great

Britain, was made about the middle of the last century. Dr. Home of Edinburgh, introduced the use of water acidulated with sulphuric acid, as more powerful than sour milk. By the quicker operation of this liquid, the souring of the cloth was effected in a few hours, instead of occupying days and weeks as formerly; and in the whole process so much time was saved as to reduce it from eight months to four.

A still greater improvement was the result of the discovery of chlorine, or oxymuriatic acid. This powerful chemical agent was discovered by Scheele, a Swedish chemist, in 1774, who observed its property of destroying vegetable colors, from its having bleached the cork of his phial. This fact became known to Bertholet, a French chemist, to whom the idea occurred of applying it to the bleaching of cloths; and, in 1785, having found by experiment that it answered the purpose, he made known *this great discovery.*

James Watt, the improver of the steam engine, learned from Bertholet, at Paris, the success of his experiment, and introduced it in England with success in 1786. Mr. Henry, of Manchester, also introduced an improvement in 1788, by the addition of lime in order to overcome the noxious smell of the acid. But there were still some objections to the process. Mr. Tennant, of Glasgow, after much laborious investigation, discovered the method of making a saturated liquid of chloride of lime, and produced what is now known as "Tennant's Bleaching Powders"—which was found to answer perfectly all the purposes of the bleacher,—and brought the article into common use. Every thing is now performed by machinery or the use of chemical agents, and the process of bleaching is reduced to a few days.

The art of *Calico Printing*, though apparently one of the most difficult, has been practiced from a remote era. Herodotus mentions "that a nation on the shores of the Caspian were in the habit of painting the figures of animals on their clothes, with a color formed from the leaves of trees bruised and soaked in water; and he adds, that this color is not effaceable." There is a passage in Pliny, which though somewhat obscure, shows that the Egyptians were fully acquainted with the *principle* of calico printing.

A process, similar to the one practiced by the Egyptians is known to have been followed in India from the earliest times. The chemical and mechanical inventions of modern ages have been the cause of vast improvements in this beautiful art; but in this instance, it appears, the moderns have been only perfecting and improving processes practiced in the remotest antiquity. It is believed that calico printing was not practiced in Europe till the 17th century, and did not commence in England till about 1675, where it is now a very important and valuable business. In the year 1690, an establishment was commenced on the banks of the Thames near London, but the goods there printed were confined to muslins and calicoes imported from India. With a view to fostering and encouraging this branch of industry, the British government passed an act in 1700 forbidding the sale or use of foreign printed goods. And to prevent the use of foreign calicoes interfering with the domestic production of linen and woolen stuffs, an act was passed 1721 imposing a penalty of £5 upon the wearer, and £20 upon the seller of a piece of calico. Fifteen years after, this statute was so modified, that calicoes manufactured in Great Britain were allowed to be worn, "*provided the warp thereof was entirely of linen yarn:*" in 1774, a statute was passed allowing printed goods made wholly of cotton to be used. And this branch of trade has also been further protected by several subsequent acts, as in 1782, prohibiting the exportation of any materials used in printing, &c., and in 1783, giving bounties on the export of British printed goods; and several other statutes were enacted on the same principle until 1787, an excise duty of 3d, which was afterwards raised to 3½d. was imposed on all printed cottons. But the same was allowed as a drawback on the goods when exported. This act was wholly repealed in the year 1831, mainly through the exertions of Mr. Thompson, afterwards Lord Sydenham.

The old method of printing calicoes was by using blocks of wood, on the surface of which the pattern was cut in relief, like the common method of wood engraving; thus the figure was impressed upon the cloth: only one color could be used at once; and if other colors were required to complete the pattern, it was necessary to repeat the operation with different blocks. This was a slow and expensive method, and required great manual dexterity.

The great improvement in the art was the invention of *cylinder printing*, which bears nearly the same relation, in point of dispatch, to block printing by hand, as throstle or mule spinning bears to the one-thread wheel.

This great invention is said to have been made by a Scotchman of the name of Bell, and was first successfully applied about the year 1785. By subsequent improvements, this method has attained great perfection. At the present time, a piece of cloth containing thirty-five yards, *when everything is properly prepared*, can be printed by the *cylinder machine*, in the best manner with six or eight different colors, in less than five minutes.

The period of the establishment of the cotton manufacture in England, was one of peculiar interest to that nation, and is well worth the serious study of the political economist. At its commencement, she had just lost her American Colonies—retiring from that contest reduced in her national means of aggression and defense to an amount exceeding *one hundred thousand men* and *one hundred millions of money.* The French Revolution and the frightful struggles which followed that event, brought her into collision with the other European powers, which resulted in the continental system of the Emperor of the French, having for its principal object, the humbling of England by the exclusion of her manufactures from the continent. Yet the quiet but ceaseless activity of her spindles and her looms, enabled her to turn these seemingly disastrous events into sources of individual profit and national strength. Her lost colonies became her best commercial customers; and the paralysis upon the manufacturing interests of the continent produced by that very system, gave to her the lion's share in the commerce of the world. The superiority of her marine and her insular position, enabled her to protect her commerce and manufactures, of which the larger though the newer branch was the *cotton manufacture;* while the profits of the latter enabled her not only to sustain the former, but also, to subsidize her allies, and in the end to conquer her enemies. *The genius of Napoleon was not a match for that of* HARGREAVES, ARKWRIGHT, CROMPTON AND CARTWRIGHT.*

Her manufacturing enterprise would, however, soon have found its limit, had it not been for the perfecting of the Steam Engine by WATT, who in 1785 first applied this motive power to cotton factories.

The following table from De Bow, will show the early progress of the cotton manufacture in Great Britain, prior to the invention of the spinning-jenny by Hargreaves:

Years.	Raw Cotton Imported.
1697	1,979,359 lbs.
1701	1,985,868 "
1710	715,008 "
1720	1,972,805 "
1730	1,545,472 "
1741	1,645,031 "
1751	2,976,610 "
1764	3,870,392 "

The spinning-jenny of Hargreaves went into operation in 1767; and Arkwright's improvement was patented and put in operation in 1769. The influence of these, and other inventions and improvements made afterwards, on the manufacture and trade, may be seen by inspecting the following table:

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* Of cotton goods alone, the exports of England, between 1793 and 1815, amounted to TWO HUNDRED AND FIFTY MILLION-POUNDS STERLING!

Years.	Cotton Imported.
1781	5,198,778 lbs.
1785	18,400,384 “
1790	31,447,605 “
1795	26,401,340 “
1800	56,010,732 “
1805	56,682,406 “
1810	132,488,935 “
1811	91,576,535 “
1812	63,025,936 “
1813	50,966,000 “
1814	60,060,239 “
1815	99,306,343 “

The importations of cotton into England, from all sources, since 1816, have been as follows, according to the statement of Messrs. George Holt & Co., cotton brokers at Liverpool:

Years.	Cotton Imported.
1816	93,000,000 lbs.
1820	143,000,000 “
1825	222,000,000 “
1830	261,000,000 “
1835	361,000,000 “
1837	408,000,000 “
1838	501,000,000 “
1839	388,000,000 “
1840	583,000,000 “
1845	721,979,953 “
1850-51	800,000,000 “

In 1830, the exports of cotton goods were about £12,000,000. In 1840, £24,668,618, and in 1850, the total declared value was £28,252,878.

A leading English paper in speaking of the “Great exhibition of the Industry of all Nations,” says of the department devoted to cotton goods,—Though it might not have appeared so attractive to the common observer, *yet to the statesman and political economist, it was preëminently interesting.* The total number of Cotton Factories in Great Britain, is 1,932; containing 20,977,017 spindles and 249,627 power looms. The amount of capital employed, is probably over two hundred and fifty millions of dollars, and the annual product of goods is about the same sum. The motive power in these factories is supplied by steam, representing 71,005 horse power, and water, representing 11,550 horse power. The total number of persons in Great Britain dependent upon this branch of industry for their daily subsistence cannot be much less than one million five hundred thousand, some writers say more than two millions. Soon after the invention of cotton machinery it was introduced among the various nations of the continent of Europe.

In FRANCE, the greatest manufacturing power of Continental Europe, the earliest manufactures of cotton goods date from the latter years of the 17th century.* As early as 1688, we find the importations at the port of Marseilles from the Levant included 1,450,000 lbs. of spun yarn and 450,000 lbs. raw cotton. In 1750, they had increased to 3,831,620 lbs. of the raw material, and 3,381,625 lbs. of yarn.

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* For the following facts touching the cotton manufactures on the continent of Europe, I am principally indebted to translations from the Dictionnaire Geographique et Statisque of Adrien Guibert, published at Paris in 1850, and Wilhelm Hoffman's Allgemeine Encyclopedia, published at Leipzig in 1848, kindly furnished me by an accomplished linguist of this city. I have not been able to find later or more reliable statistics.

Spinning frames from the English designs were made at Amiens in 1765; and in 1784 Mr. Martin, of that town, obtained permission to establish a cotton factory. Cotton manufactures in France, did not, however, obtain to any important extent till the beginning of the present century. In 1806 a commission of inquiry reported that "the art of spinning cotton was completely established in France." At the present time her factories are consuming annually about 150 million lbs. of cotton, and are running about 4 millions of spindles.

The French cotton goods stand preëminent for taste. The best of these are made at Mulhausen on the Rhine, where the first printed goods were produced about the close of the 18th century, by Koechlin & Co., celebrated dyers and printers. At that time these goods were considered by the French India Trading Company as an interference with their privileges, and they succeeded in prohibiting the use of them in France. This continued till the French revolution took place; since when the Mulhausen calicoes have attained a world-wide reputation.

The application of chemistry to the arts of bleaching and coloring have produced the most important changes for the French manufacturers. The great discoveries in this science by her distinguished sons have enabled her manufacturers to outstrip all their competitors in dying and printing.

The celebrated Turkey-red color was first applied to *cloth* in 1810, by the Messrs. Koechlins, before named. Those gentlemen have also the honor of discovering, in 1811, the art of *printing* upon Turkey-red, which is done by printing upon that color with some powerful acid; and then immersing it in a solution of chloride of lime. Neither of these agents alone affects the color, but those parts which have received the acid, on being plunged in chloride of lime are speedily deprived of their dye, and made white by the acid of the liberated chlorine. *This is said to be one of the most beautiful facts in the chemistry of calico printing.*

In addition to their superiority of colors, the French are quite as celebrated for the combinations of them and for the great beauty of their designs. These are so generally recognized that English and American manufacturers are now in the practice of importing and applying them to *their* work. To show the *great* importance attached to these particular branches of manufacturing, it will suffice to state that the French government has established a *public school* for the teaching of the art of designing as applied to cotton and woolen goods, to which every child, however humble, has access, if showing the proper talent.

In AUSTRIA the cotton manufacture gives employment the whole year round to hundreds of thousands of individuals; but no other branch is subject to such fluctuations, and these are occasioned in the first place, by the necessity for drawing the supply of the raw material from abroad. The rapid development of the cotton manufacture is shown in the clearest manner by the quantities imported at given periods. On an average of the five years 1843 to 1847 inclusive, they had increased to 403,100 cwt. In the year 1846 they had reached 447,300 cwt. The increase of this manufacture has been sevenfold in the last 18 years. In the year 1847 the Austrian monarchy contained 206 spinning mills, with 6,125 spinning machines, and 1,421,986 spindles.

The total production in the year 1849, of cotton yarn and twist, was 397,240 cwt. The number of work-people employed directly and indirectly in the spinning mills is about 50,000. In addition to their own production of cotton yarn they import considerable from abroad, mainly from England. Most of their weaving is done by hand looms. The number of hands employed in *cotton weaving* is not less than 300,000.

SWITZERLAND ranks next to England, in comparison with the number of her population, in the production of woven and spun cotton; it is likewise one of the countries that consumes the most. She has in operation more than 950,000 spindles, and manufactures all the numbers up to 250 (English.) The Swiss possess about 250 dying establishments for thread and woven stuffs. The Turkey-red dying establishments are of great renown. The manufacture of printed cottons commenced in this country about the middle of the 18th century. Her first spinning establishment by machinery was erected about the beginning of the present century. During their early stages her manufacturers had every thing to contend against in the shape of French prohibition and *English competition;* but her energy and industry have overcome every obstacle, and they are now firmly established.

BELGIUM in 1844 was running about 420,000 spindles.

Cotton spinning was introduced into SAXONY in the

16th century. The first articles made were cotton scarfs or veils, of about two yards length, and were purchased by Greek Merchants to be sold to the Turks for turbans. In 1650, an article called "Cotton Crape" was the first result of the improvements made in weaving. At that time the weaving was done by men and women at their own houses. In 1774, owing to the importations of English yarns underselling the domestic spinner, corporations were formed and attempts made to introduce English machinery. In 1800, the first spinning machine was built, by an Englishman, named Whitfield In 1813, all Saxony had but 85 spinning frames, and in 1845, she had 500,000 spindles, employing 12,000 hands.

PRUSSIA, *Baden, Wirtemburg and other small German* principalities were using in 1846, about 100,000 bales of cotton, and running 1,000,000 spindles. Their imports of yarns from England are decreasing annually, and their exports of the same article are increasing.

RUSSIA, in 1841, imported about 30,000 bales of cotton, of which about 2,500 were from the United States, 17,500 from England, and the remaining 10,000 bales from India, Persia, &c. During that year she made 32 million pounds of yarn. The cotton from India imported by Russia, is mostly spun by hand, being a very short staple. In addition to the above importation of cotton, she received from other countries 24 million pounds of yarn, nine-tenths of it from England. The portion brought from Central Asia, is of inferior quality and used only for coarse cloths. Russia at that time had 700,000 spindles, and is annually increasing her cotton manufacture.

Egypt.—As soon as Mehemit Ali obtained sway in Egypt, his powerful mind sought for means to render him independent of foreign powers. He introduced workmen from abroad, and erected immediately the first cotton factory at Cairo on the Nile. At Malta (a place deriving its name from the Maltese operatives employed there), he also built a large factory to operate 200 looms. He experimented with different varieties of cotton, in order to ascertain the kind best adapted to the climate and soil of Egypt.

In connection with these experiments, M. Jumel, formerly a French merchant in the city of New York, introduced cotton seed and gins from the United States, about 1820 and 1821, and succeeded fully in establishing them. In 1828, the Sea Island was planted, and produced an article of good quality, which is still cultivated, and known in commerce as " Egyptian Sea Island."

Turkey under her present Sultan is making commendable progress in various manufactures, and among them the manufacture of cotton is by no means neglected. At the World's Fair in London, there were exhibited no less than twenty-five varieties of cotton, the product of Turkey, and upwards of one hundred and fifty articles of cotton manufacture, including those combined with gold, silk and woolen, many of which were of great beauty and gorgeousness. Among the more common and useful articles were specimens of cotton duck for sails. But it is impossible at present, to get correct statistics of the manufactures of this empire.

This important manufacture is now on the increase in the other European States; but I have not been able to obtain sufficiently correct statistics to enable me to state the amount or the degree of perfection to which they have arrived.* The yarns of England are still exported to the continent, to the amount of many millions annually, which are there woven into cloth, principally by hand looms.

CHINA AND THE EAST INDIES.—It is impossible to procure very reliable data or estimates of the production and consumption of these over-populated portions of the Globe, but enough is known to render it certain that they are vastly greater than of all the balance of the world. Mr. John Chapman, founder and late manager of the Great Indian Peninsular Railway Company, in his work on the Cotton and Commerce of India, remarks that the estimates by various writers of the consumption of cotton in India, range from one thousand millions to three thousand millions of pounds. The average of these amounts is nearly double the greatest crop of cotton ever raised in the United States. CHINA

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* Messrs. Du Fay & Co. of Manchester, have published the following interesting table, giving a comparative estimate of the quantities of raw cotton consumed in the principal manufacturing countries, in millions of weight, from 1836 to 1851. (The figures for the United States are much too low.)

	1836.	1840.	1845.	1849.	1851.
Great Britain, (millions of lbs.) . .	350	473	597	627	648
Russia, Germany, Holland, and Belgium,	57	72	96	160	118
France, (including adjacent countries),	118	157	158	186	149
Spain, ...	—	—	—	—	34
Mediterranean, ...	—	—	—	—	12
Countries bordering on the Adriatic, .	28	28	38	47	45
United States of North America, .	86	111	158	205	158
Sundries, ...	—	—	—	—	11
Total (millions of lbs.) . .	639	841	1047	1225	1175

produces annually more than 500,000 bales of the Yellow or Nankin cotton, besides which she imports largely from India.

During the period, Mr. President, of the brilliant inventions and improvements in mechanical contrivances, which have been described, our fathers had no time to devote to such pursuits. They had other work on their hands of still *greater importance.* They were resisting the encroachments of tyranny, organizing military forces, promulgating a declaration of Independence, preparing constitutions, and founding a Republic.

As soon as they had made good their declaration, perfected their constitution, and formed a more *perfect union* (which we trust may last forever), they turned their attention to the arts of peace.

Before describing the rise and progress of cotton manufactures in the United States, the introduction and growth of the raw material claims our attention.*

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* The following synopsis of the history of the early introduction of Cotton into the United States, is given by a writer in the Charleston Mercury, which I quote entire :—

On this interesting subject I find the following information in Governor Seabrook's "Memoir on the Cotton Plant," published a few years ago.

"In a pamphlet of the date of 1666, entitled 'A Brief Description of the Province of Carolina, on the Coast of Florida,' the writer, in speaking of the Cape Fear settlements, made only two years before, says,—'They have indigo, tobacco very good, and cotton wool.' Dr. Hewitt, in his historical account of South Carolina and Georgia, while commenting on the introduction of silk into the former, and the products of the earth, for which premiums ought then to have been given to those who should bring to market the greatest quantities of them, alludes particularly to cotton, and after detailing the manner of planting it, remarks that this article, 'though not of importance enough to have occu-

The precise circumstances under which the cultivation began in the Southern States, the time when and the place where it obtained first a permanent footing, are involved in much obscurity. The attention of in-

pied the whole attention of the colonists, might, nevertheless, in conjunction with other staples, have been rendered profitable and useful.'

"In Wilson's account of the 'Province of Carolina, in America,' published in 1682, it is stated that 'Cotton of the Cypress and Malta sort grows well, and a good plenty of the seed is sent thither.' In Peter Purrey's description of the Province of Carolina, drawn up in Charleston in 1731, 'Flax and cotton' are said to 'thrive admirably.' In the journal of Mrs. Pinckney, the mother of General Thomas, and General Charles C. Pinckney, who, as Miss Lucas, when only eighteen years of age, was entrusted with the management of the planting interest of her father, the Governor of Antigua, is the following memorandum: 'July 1, 1739, wrote to my father to-day a very long letter on his plantation affairs—on the pains I had taken to bring the indigo, ginger, cotton, lucerne and casada to perfection, and that I had greater hopes from the indigo than any other.' 'June, 1741, wrote again to my father on the subject of indigo and cotton.'

"It is a well authenticated fact, that in 1736, as far north as the thirty-ninth degree, cotton 'on the garden scale,' was raised in the vicinity of Easton, in the county of Talbot, on the eastern shore of the Chesapeake Bay. About forty years afterwards, it was cultivated in St. Mary's county, Maryland, and in the northern county of Cape May, in New Jersey; also in the county of Sussex, in Delaware.

"Among the exports of 'Charles Town,' from November 1747 to November 1748, are included seven bags of cotton wool, valued at £3 11s. 5d. per bag. In 1754, some cotton was again exported from South Carolina. In 1770, there were shipped to Liverpool three bales from New York, four bales from Virginia and Maryland, and three bales from North Carolina. Before the Revolutionary war, Virginia exported, *communibus annis*, hemp, flax-seed, and cotton, to the value of $8,000. In 1784, an American vessel that carried eight bags to Liverpool was seized, on the ground that so much cotton could not be produced in the United States. In 1785, 14 bags; in 1786, 6 bags; in 1787, 109 bags; in 1788, 389 bags; in 1789, 842 bags; and in 1790, 81 bags, were received in Europe from this country. Of these, 153 bags were sent directly, and a portion of the remainder by the way of Philadelphia and New York, from Charleston. The first bag of cotton sold in South Carolina, was purchased, in 1784, by John Teasdale, from Bryan Cape, then a factor in Charleston. The first bag of the wool exported from that city to Liverpool arrived January 20, 1785, per Diana, and was consigned to Messrs. J. & J. Teasdale & Co."

Gov. Seabrook, in the pamphlet from which the above are extracts, after telligent persons must have been called to it before the commencement of the Revolutionary War, as we find the first provincial congress of South Carolina, held in January, 1775, recommended to the inhabitants to raise *cotton;* yet little practical attention was paid to their recommendation. A small quantity only was raised for domestic manufacture. Soon after the peace of 1783, its cultivation spread, and Georgia took the lead in its production. Among the planters who raised cotton upon a large scale (as it was then called), was Mr. Teake of Savannah: in 1788 his crop was 5,000 pounds in the seed.

The commencement of the cultivation of sea-island cotton is more clearly ascertained.

Some of the colonists who adhered to the royal

assigning very satisfactory reasons for his belief that the seed of short staple cotton was originally introduced into this country from the Mediterranean, says, "Peter Purrey is represented to have brought with him among other seeds, that of cotton. This, and a paper of the same material, received by the Trustees for the settlement of Georgia, from Phillip Miller of Chelsea, England, it can scarcely be questioned, were from the Mediterranean." Mr. Wilson, already quoted, says expressly that the Carolina sort was from Cyprus and Malta. In a pamphlet entitled "American Husbandry," published in London, in 1775, the writer remarks, that "the cotton cultivated in our colonies is of the Turkey kind. On the other hand, it must be supposed, from the language of their historian, that the Cape Fear emigrants, who began the growing of the gossypium only two years after they had established their settlements, were provided with seed from Barbadoes."

In reference to sea island or black seed cotton, the writer states that it "began to be raised in Georgia in experimental quantities, in 1786." The native place of the seed is believed to be Persia. It is designated the Persian cotton by Bryan Edwards, and is so called in the West Indies and by the merchants of England. The seed grown in this country came from the Bahama Islands, where it had been introduced by the Board of Trade, from Anguilla, a small island in the Carribean sea, and was sent by Mr. Tatnall, then Surveyor General of the Bahamas, Col. Relsell, and others, to Governor Tatnall, James Spalding, Richard Leake, and Alexander Bisset, all of Georgia.

cause, had fled to the Bahama Islands; and learning that the inventions of machinery in England had caused a great demand for raw cotton, they were induced to turn their attention to its cultivation. The small island of Anguilla, in the Caribbean Sea, was celebrated for its excellent cotton (the seed supposed to have come originally from Persia); and from thence the Bahama settlers received their seed. By the year 1785, they had succeeded in raising cotton on two of the islands; from one of which Mr. Spalding, of Georgia, received a bag of cotton seed: other Georgians also had similar contributions from their former acquaintances in that colony. From this seed all the Sea Island Cotton plants have been produced.

The species of cotton first introduced, known in commerce by the name of "upland," adheres to every part of its seed with great tenacity: the infinite delay and trouble attending the separation of the fibre from the seed, greatly retarded the extension of its growth. Among the early cultivators, the fibre was usually separated from the seed by the hands of laborers. Rollers and the bow-string were subsequently introduced, but the process with their assistance was exceedingly slow and expensive. From this process the upland cotton took the name in the English market of "Bowed Georgia," and it is now sometimes quoted by that name, although the instrument has been entirely out of use more than fifty years.

Unless some other means could be devised for preparing the cotton for market, all saw that the amount produced, must be very small.

The machine for effecting this desirable object was invented by Eli Whitney, a native of Westborough, Mass. He received his education at Yale College, and graduated in the Autumn of 1792. Soon after this, he went to Georgia in quest of fortune, taking with him a New England boy's usual capital, consisting of a good education, a jack-knife and self-reliance. While residing in that State in the family of Mrs. Green, widow of the late Gen. Green, the cultivation of cotton was exciting universal interest in that section of country. Mr. Whitney often heard gentlemen at the house of this lady express their regrets at the want of some economical method of preparing it for market. With a prophetic perception of its invaluable importance, he went to work to invent a machine that should answer the purpose. After many weeks of intense application his machine was completed; and the SAW-GIN was produced. This was in the latter part of the winter of 1793.* Unlike most other important inventions, this machine does not owe its useful qualities to successive improvements of others, but came forth perfect from the hands of the inventor, and remains in all its essential parts, precisely as Mr. Whitney left it. No invention of labor-saving machines has produced as important results as this. The agricultural resources of the cotton growing States "sprang forth with newness of life," and the United States, which before this had not been known as a cotton-growing country, immediately took the lead in the production of this great staple. The cheapness with which the material could now be produced greatly increased the demand, and this country has for many years furnished more than four-fifths of the cotton used by the civilized world.* It is painful to follow further the personal history of this great man. Although his invention benefited his country untold millions, yet he received no adequate compensation. Though depressed by pecuniary embarrassments, no public reward, like the English grants to their successful inventors, soothed the evening of his life. He is dead. No national monument has been erected to his memory expressive of the gratitude of his countrymen for the transcendent benefit his genius has conferred upon them; but private affection has placed

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* The following well-authenticated incident in the life of Mr. Whitney, as related by himself to the father of a highly respectable gentleman of this city, is well worth preserving, as a striking illustration of the fact, that the most important results often originate in the most trivial and accidental circumstances. Mr. Whitney stated that while walking for exercise one day after dinner, with a toothpick in his hand, and being in deep meditation upon the project of constructing an instrument for separating cotton from the seed, he picked up a boll of cotton which accidentally lay upon the ground before him; and in trying the tenacity of the fibre to the seed, he mechanically separated the one from the other with his tooth pick. The thought flashed upon his mind, that a proper arrangement of *metallic points* so as to be brought in contact with the fibre to the exclusion of the seed, would effect his object. This was his cue, and the invention of the *Saw-gin* was the result.

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* The following table, derived from Burn's statistics of the cotton trade, exhibits the proportion and actual amounts of cotton annually supplied to England from different parts of the world, on the average of thirteen years, ending 1846.

	Per cent. of the total supply.	lbs. supplied.
From the United States	79¼	380,568,958
" Brazil	4½	21,462,150
" Egypt	2½	12,123,790
" West Indies	1	4,432,777
" East Indies	12¾	61,578,371
	100	480,166,046

upon his tomb at New Haven in Connecticut this inscription:

ELI WHITNEY,

THE INVENTOR OF THE COTTON GIN.

OF USEFUL SCIENCE AND ARTS, THE EFFICIENT PATRON
AND IMPROVER.

IN THE SOCIAL RELATIONS OF LIFE, A MODEL OF
EXCELLENCE.

WHILE PRIVATE AFFECTION WEEPS AT HIS
TOMB, HIS COUNTRY HONORS HIS
MEMORY.

BORN DECEMBER 8TH, 1765,
DIED JANUARY 8TH, 1825.

In my researches into the exports of cotton, I find it stated, but am not certain of the authority, that in the year 1770, there were shipped to Liverpool, three bales of cotton from New York, four from Virginia and Maryland, and three barrels from North Carolina; though in 1784, the year after the close of the Revolutionary war, a vessel that carried eight bales of cotton from the United States to Liverpool, was seized in that port on the ground that so large a quantity of cotton could not be the produce of the United States.* In a British work, I find the following statement: Cotton imported from America, in 1785, as follows—one bag per Diana, from Charlestown; one per Tonyn, from New York; three per Grange, from Philadelphia. Part of these cottons were seized in Liverpool under the impression, *that cotton was not the produce of the United States.* From an official table prepared by N. Sargent, Esq., Register of the Treasury Department, I find [redacted] the value of cotton exported from the 1st of October, 1789, to 30th June, 1851, to be as follows:

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* I have been informed by Gen. Duff Green, that the first shipment of cotton from the United States to England, was from Savannah, by a person named Miller. It was brought from the interior of Georgia in a pocket handkerchief by a woman, and given in exchange for a pound of copperas and a few pins. Mr. Miller was living a few years ago and well-known in Savannah, as "*Cotton Miller.*"

STATEMENT OF THE VALUE OF COTTON EXPORTED FROM THE UNITED STATES, FROM THE 1ST OCTOBER, 1789, TO 30TH JUNE, 1851.

Years ending 30th Sept.	COTTON.	Years ending 30th Sept.	COTTON.	Years ending 30th Sept.	COTTON.
1790	$42,285	1811	$9,652,000	1832	$31,724,682
1791	52,000	1812	3,080,000	1833	36,191,105
1792	51,470	1813	2,324,000	1834	49,448,402
1793	160,000	1814	2,683,000	1835	64,661,577
1794	500,000	1815	17,529,000	1836	71,284,925
1795	2,250,000	1816	24,106,000	1837	63,240,102
1796	2,200,000	1817	22,628,000	1838	61,556,811
1797	1,250,000	1818	31,334,258	1839	61,238,982
1798	3,500,000	1819	21,081,679	1840	63,870,307
1799	4,100,000	1820	22,308,667	1841	54,330,341
1800	5,000,000	1821	20,157,484	1842	47,593,464
1801	9,100,000	1822	24,035,058	9 mos. to 30 June, 1843,	49,119,806
1802	5,250,000	1823	20,445,520	Years ending 30th June.	
1803	7,920,000	1824	21,947,401	1844	51,063,501
1804	7,650,000	1825	36,846,649	1845	51,739,643
1805	9,445,500	1826	25,025,214	1846	42,767,341
1806	8,332,000	1827	29,359,545	1847	53,415,848
1807	14,232,000	1828	22,487,229	1848	61,998,294
1808	2,221,000	1829	26,575,311	1849	66,396,967
1809	8,815,000	1830	29,674,883	1850	71,984,616
1810	15,108,000	1831	25,289,492	1851	112,315,317

From this table we see that the total declared value of the exports of raw cotton from the United

States from 1790 to 1851 inclusive, amounts to the immense sum of ONE THOUSAND SEVEN HUNDRED AND ELEVEN MILLION, SIX HUNDRED AND NINETY-ONE THOUSAND, SIX HUNDRED AND SEVENTY-SIX DOLLARS ($1,711,691,676), and this is exclusive of the large quantity that has been consumed in our own country. There is nothing to be compared to this in the history of commerce or in the annals of human industry. *This perhaps is not the proper place or occasion to indulge in the reflection, as to what the effect upon the resources and development of our own country would have been, had its circumstances been such, or could the policy of the government have been so shaped, that instead of exporting barely the raw material, it could have had its value enhanced by* HOME LABOR, *by manufacturing it into cloth or simply into yarn, before exportation.*

The capital invested in the *culture* of cotton, which has produced the foregoing extraordinary results, was estimated by the late Hon. Levi Woodbury, in his very able report, as Secretary of the Treasury, made in February, 1836, at $740,000,000 permanent, and $30,000,000 floating. Assuming this calculation to be correct, (and the value of lands, &c., and the produce per acre, do not now vary materially from his estimate at that time,) I find that the total amount of capital invested at the present time in this branch of the agricultural industry of the United States cannot vary much from $1,500,000,000.*

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* A recent writer says of this report of the late Secretary, that in making his calculations he estimated the number of acres in cotton at 2,000,000, and the annual product at 300 lbs. net cotton per acre. This is entirely too large an estimate of the yield per acre; and consequently he made the number of

The first mention I find of American Manufactures for sale, is from an advertisement in the Pennsylvania Gazette, April 3d, 1782, by Samuel Wetherell, who advertised Jeans, Fustians, Everlastings, Coatings, &c., to be sold *at his manufactory*, in South Alley, between Market and Arch Streets, Philadelphia.

Machinery, other than the one-thread wheel, common loom and hand cards, had not then come into use. In 1786, Mr. Orr, of East Bridgewater, Massachusetts, employed Robert and Alexander Barr, from Scotland, to construct carding, spinning and roving machines. On the 16th of November, 1786, the Legislature of Massachusetts, to encourage the machinists, made them a grant of £200, lawful money. In March, 1787, Thomas Somers, (an English Midshipman,) also constructed a model of a spinning jenny, for which he received £20, lawful money, from the State Government. The above machines and model, remained in Mr. Orr's pos-

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acres too small, and the production too large. By the best calculations from the census of 1840, and other sources, the writer alluded to above, estimates the capital employed in the production of cotton as follows:—

1,200,000 slaves, at $500 each, is - -	$600,000,000
4,500,000 acres of land, at $10 per acre, - -	45,000,000
14,000,000 acres of land, in timber, pasture, &c., at $3 per acre, - - - - -	42,000,000
6,300,000 acres of land, in grain, at $10, - -	63,000,000
400,000 mules and horses, at $100 each, -	40,000,000
4,500,000 hogs and sheep, at $1 each, - -	4,500,000
300,000 cattle, at $5 each, - - -	1,500,000
500,000 plows, at $2 each, - - - -	1,000,000
Waggons, and other plantation implements, &c.,	1,000,000
	$798,000,000

There does not, however, appear to be any data that can be relied on to make an accurate calculation on this subject.

session, for the inspection of all disposed to see them; and he was requested by the General Court to exhibit them, and to give all explanations and information in his power respecting them. It is believed that these machines were the first made in the United States. Several machines from these models were made for different persons, and used in private houses.

The first Cotton Factory established in the United States, was at Beverly, in Mass., about 17 miles from Boston. It was organized in 1787, with (as is stated) a large capital. It continued in operation about fifteen years, making corduroys, bed tickings, and cotton velvets. The warps used were probably of linen. Yet the business was not profitable—the loss having been as great as ninety cents on the dollar—Gen. Washington visited this establishment on his tour thro' the country in 1789. Great interest was excited throughout all the northern and eastern States on the subject of manufactures. No models of machinery used in England could be procured, as the English Government, *with a jealous care for their own interests*, had prohibited, under heavy penalties, the exportation of any machines, or models or drawings of them. Many attempts were made to procure models, without success. TENCH COXE, one of the earliest, ablest, and most devoted friends of American manufactures, engaged a person to send him from London, complete brass models of Arkwright's patents. The machinery was completed and packed, but was detected by the custom-house officers and forfeited.

All attempts to introduce the Arkwright machinery had proved unsuccessful. But the cupidity of the British Government, aided by the utmost vigilance of its officers, could not prevent its introduction. Mr. SAMUEL SLATER, who had served a regular apprenticeship to the Cotton-spinning business, under Sir Richard Arkwright's partner, Mr. Strutt, arrived in New York in the month of Nov., 1789. In a letter, written by himself the 2d of Dec. following, to Moses Brown, of Providence, R. I., he says, "A few days ago, I was informed you wanted a manager of cotton spinning. If you are not provided for, I should be glad to serve you, though I am in the New York Manufactory. But we have but one card, two machines and two spinning jennies, which I think are not worth using. *My intention is to erect a perpetual carding and spinning*" (meaning Arkwright's patents). The answer to this letter was such, as to induce him to go to Providence; and in Jan. 1790, he made an arrangement with Messrs. Almy & Brown of that city, to commence preparation for spinning cotton at Pawtucket. There he commenced making machinery, principally with his own hands; and on the twentieth of the next December, he started three cards, machines for drawing and roving, and seventy-two spindles. *These were the first Arkwright machines put in operation in this country; and the credit* of introducing them belongs to SAMUEL SLATER. He had no models or drawings to aid him in the construction of the machines, having been deterred from bringing them, for fear of detection by the British Government.

Some of Mr. Slater's first yarn, and some of the first cloth made in America *entirely of cotton*, was sent to the Secretary of the Treasury, the 15th of October, 1791.

Although they had some difficulty at first in disposing of their yarn, their business slowly increased; and, somewhere about 1795, Mr. Slater, in company with Mr. Oziel Wilkinson, built a small mill on the Massachusetts side of the river, at Pawtucket, *which was the first cotton factory in Massachusetts, with machinery on the Arkwright principle.* Their business continuing prosperous, and Mr. Slater's brother having arrived from England and brought a knowledge of the recent improvements of the English spinners, Almy and Brown and the Messrs. Slaters turned their attention to a more extended investment in cotton spinning; and in 1806, the village of Slatersville, R. I., was projected: a large factory was erected, and they commenced spinning in the Spring of 1807.

I have not time, on this occasion, to follow the personal history of Mr. Slater. I find the following obituary notice, copied from one of the periodicals of the time:—

"April 20th, 1835, died, at Webster, Mass., aged 67, SAMUEL SLATER, long known as an enterprising and respected citizen of Rhode Island, AND THE FATHER OF THE COTTON MANUFACTURES OF THIS COUNTRY, in which he acquired a great estate. The first cotton manufactory in the United States was built by Mr. Slater at Pawtucket R. I., which was standing and in operation at the time of his death." *

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* An attempt to manufacture cotton was made at Derby, in Connecticut, under the patronage of Col. Humphreys, late Minister to Spain.

One at or near Hurlgate, N. Y., under the patronage of Mr. Livingston, was commenced, but failed and was abandoned. I believe nearly all the cotton factories in this country from 1791 to 1805, were built under the direction

Small factories spread in Rhode Island about the year 1807, and improvements began to be introduced by American artisans. As early as 1808, $80,000, was invested in the Globe factory, Philadelphia. The Arkwright machinery was introduced very early at Copp's Creek and at Kirk's Mill in Delaware.

But other sections of the country were also turning their attention to this important business.

ALEXANDER HAMILTON early saw the importance of manufactures to the country, and in his able report on the subject, made during Washington's administration, gave a sound tone to the public mind. *His memory should ever be held sacred by American manufacturers, as one of their earliest, ablest and best friends.*

In the early part of the year 1791, *on his recommendation, and by his active and influential exertions,* a number of spirited individuals of New York, New Jersey and Pennsylvania, associated themselves for the purpose of "establishing useful manufactures," by the subscription of a capital of more than $200,000. The general object of the association was to lay the founda-

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of men who had learned the art or skill of building machinery, in Mr. Slater's employ.

Mr. Slater used to spin both warp and filling on the water frame, up to 1803.

Mules for spinning filling had not then been introduced. The cotton used to be put out to poor families in the country, and whipped on cords, stretched on a small frame about three feet square, and the motes and specks were picked out by hand, at from four to six cents per pound, as it might be for cleanness.

Mr. Slater used to work cotton from Cayenne, Surinam and Hispani ola, and made first quality of yarn. Sometime after, when short cotton began to be used, he mixed about one-third: he called the yarn of such, second quality, making 15 cts. per lb. difference. Thus, while number 12 was 84 cts. of 2d quality, number 12 of first quality was 99 cts. per pound.—*Memoir of Slater, pp.* 106–7.

tion of a great emporium of manufactures, *but their more immediate object was the manufacture of cotton cloths.*

Having resolved to establish themselves in New Jersey, the contributors were incorporated by the Legislature of the State on the 2d of November 1791, by an act authorizing a capital stock of one million of dollars, with the right to acquire and hold property to the amount of four millions, and the power to improve the navigation of the rivers, make canals for the trade of the principal site of their works, and to raise by way of lottery, one hundred thousand dollars. The act of incorporation, *which was drawn or revised by Mr. Hamilton*, also gave a city charter, with jurisdiction over a tract of six square miles.

After its organization, the society advertised their desire to purchase a suitable site for their city, with requisite water power, in any part of New Jersey. They received proposals from the "West Jersey Associates," from "South River," "Perth Amboy," "Millstone," "Bulls Falls," the Little Falls of the Passaic, and from the inhabitants of the Great Falls of that river; and in May, 1792, they selected the latter place, as the principal site of their proposed operations;—giving to their town the name of PATERSON, in honor of Gov. William Paterson, who had signed their charter. At a meeting of the Directors, on the 4th of July, 1792, appropriations were made for building factories, machine shops, and shops for calico printing and weaving. A race way was directed to be made, for bringing water from above the falls to the proposed mills. Unfortunately, the direction of these works was given to a French engineer, whose magnificent projects and reckless expenditures uselessly spent a large sum of money for the company.

In January 1793, Peter Colt, Esq., of Hartford, then Comptroller of the State of Connecticut, was appointed general superintendent of the company. The French engineer resigned; and Mr. Colt, thus in sole charge of the works, abandoned the magnificent projects of his predecessor, completed the raceway, conducting the water to the first factory erected by the society. This factory was finished in 1794, when cotton yarn was spun in the mill. Yarn had been spun at this place the preceding year, by machinery moved by oxen. In 1794, calico shawls and other cotton goods were printed; but, owing to a combination of causes, the company resolved, in 1796, to abandon the manufacture, and discharged their workmen. No part of the failure of the enterprise was attributed to Mr. Colt; as the directors on closing their concerns, unanimously "returned him their thanks for his industry, care and prudence, in the management of their affairs, being fully sensible that the failure of the objects of the society was from causes not in his power, or that of any other man, to prevent."

The cotton mill of the company was leased to individuals, until 1807, when it was accidently burned down. In 1801 a mill seat was leased to Mr. Charles Kinsey, in 1807 a second, and in 1811 a third to other persons; and between 1812 and 1814 several others were sold or leased. In 1814, Mr. Roswell L. Colt, the present governor of the society, purchased at a depreciated price, a large proportion of the shares, and reanimated the association. From this period, the growth of Paterson has been steady, except in seasons of general or manufacturing depression.

Although out of the regular chronological order, I will mention here, that Mr. JOHN COLT, a son of Peter Colt, Esq., and a gentleman who by his education, sterling integrity, high sense of honor, and polished manners, is an honor to American manufacturers, commenced making *cotton duck*, in Paterson, the 7th of February, 1822. Cotton duck had been made in this country before, at Baltimore, and also some in New England; but the yarn was not doubled and twisted, and had to be heavily starched to prevent chafing in the reed, which rendered it nearly useless for sails, from its liability to mildew; but Mr. John Colt made the first cotton duck of doubled and twisted yarn, without starch or any kind of dressing, and also the first that was woven on power looms, The first year, he made about seventy pieces in this improved manner. In 1823, he made 201 pieces. The weaving was done by hand looms. On the 4th of March 1824, the first piece of cotton duck ever woven upon a power loom was produced. The article was found to be of excellent quality, and soon began to be extensively used for sails. Mr. Colt went on steadily increasing the manufacture. From 1826 to 1828, he averaged from five to six thousand pieces per annum. In 1831, he increased to about 9,000 pieces, and has carried the manufacture as high as 12,000 pieces per annum. There are also quantities of cotton duck made in New England, Maryland, &c.; but the article produced by Mr. Colt, has always maintained its superiority, and commanded the highest price in the market.

The English have declined to use cotton duck for sails; and one shipbuilder refused to accept a suit of sails gratis, as he was satisfied it would not answer the purpose. *Perhaps they have obtained some light on this subject, as the sails of the* YACHT AMERICA *with which they became acquainted in* 1851, *were made of the ordinary duck from Mr. Colt's Mill.*

But, to return to the regular chronological order of events, I find that in 1807 there were in Rhode Island, Massachusetts and Connecticut, fifteen mills, with 8,000 spindles, producing about 300,000 pounds of yarn annually. By a report made to the government in 1810, it appears that eighty-seven additional mills had been erected by the end of 1809, of which sixty-two were then in operation by horse and water power, running 31,000 spindles. Upon the breaking out of the war of 1812, there were in Rhode Island thirty-three cotton factories with 30,663 spindles, and in Massachusetts there were twenty mills with 17,371 spindles. The yarn spun in these factories was woven by individuals upon hand looms. At this time the country received nearly all its cotton cloth from Great Britain and the East Indies. In 1807 and 1808, there were imported from Calcutta *fifty-three millions* of yards, principally of coarse cotton goods, and worth, as prices then were, over *twelve millions of dollars.* In 1810, there were made *in all the factories* in the United States, as appears by the return of the Hon. Albert Gallatin, then Secretary of the Treasury, *only eight hundred and fifty-six thousand six hundred and forty-five yards of cotton* *cloth*, viz., in Rhode Island, 735,319; Massachusetts, 36,000; Vermont, 2,500; New Jersey, 17,500; Pennsylvania, 65,326. The whole number of yards made in the United States in that year, was sixteen million five hundred and eighty-one thousand two hundred and ninety-nine; of this 15,724,654 yards were of family manufacture. So imperfect was the machinery then in use, that the weaving alone cost *more than double* the whole process, after the introduction of the power loom.

We now arrive at an interesting period in the history of cotton manufactures in our own country. The *large enterprises* that had been attempted were premature. The Beverly Company had lost its capital. The "Society of Useful Manufactures" at Paterson, had suspended operations. I find but few who kept steadily increasing, but the increase was very slow. Those of Rhode Island, under the able lead of Mr. Slater and his associates, continued to make progress. The wars which grew out of the French Revolution, had thrown the carrying trade in a great measure into the hands of our merchants. It was very profitable, and the enterprise and capital of the country was mainly directed in that channel.

But with the war of 1812, came a different state of affairs. Our commerce for the time was nearly destroyed, and our foreign trade paralyzed. A positive necessity existed for domestic manufactures, and the men were not wanting who were equal to the emergency. To FRANCIS CABOT LOWELL and PATRICK TRACY JACKSON, both of Boston, Mass., and the able men that were associated with them, we are indebted for the establishment of the cotton manufacture on a scale so ample, that we are enabled to supply a large portion of our own consumption, and to compete successfully in distant foreign markets with the wealthiest nations of the earth.

Shortly after the commencement of the war, MR. LOWELL, who had recently returned from England, impressed with the necessity, and convinced of its practicability, proposed to Mr. JACKSON, to make the experiment on an ample scale. Great were the difficulties that beset the new undertaking. The state of war prevented any communication with England; not even books and designs, much less models, could be procured. The structure of the machinery, the very tools of the machine shop, the arrangement of the mill, all these were to be, as it were, re-invented. But men had got hold of the business now who, relying upon their own great talents, aided by the improvements in machinery which had been introduced by Mr. Slater and others, were capable of surmounting every obstacle. The first object to be accomplished, was to procure a power loom. To obtain one from England was impossible; and although there were many patents for such machines in our patent office, not one had yet exhibited sufficient merit to be adopted into general use. Under these circumstances, but one resource remained, to contrive one themselves; and this they immediately set about. After numerous experiments and failures, they at last succeeded, in the Autumn of 1812, in producing a model, which they thought so well of, as to be willing to make preparations for putting up a mill for weaving cotton cloth.

It was now necessary to procure the assistance of a practical mechanic to aid in the construction of the machinery, and they had the good fortune to secure the services of Mr. PAUL MOODY. The project had been hitherto exclusively for a weaving mill, to do by power what had before been done by hand looms. But it was ascertained that it would be more economical to spin the yarn than to buy it. A water power had been procured at Waltham, Mass., and associating with themselves some of the wealthy gentlemen of Boston, they put up a mill of about 1,700 spindles, with the necessary preparation, and power looms of their own contrivance, sufficient to weave their yarn. The mill was completed late in 1813. *This was the first manufacturing establishment in the world, that combined all the operations necessary for converting the raw cotton into finished cloth.*

The mills previously erected in this country, were for spinning only; and in England, although power looms had been introduced, they were used in separate establishments, by persons who purchased their yarn from the spinners.

Under the able management of the projectors, the business proved eminently successful, and was extended to the full capacity of the water power at Waltham. Although the first suggestions, and many of the early plans, for the new business had been furnished by Mr. Lowell, Mr. Jackson devoted the most labor and time in conducting it.

Great interest had also been excited in other sections of the country, on the subject of manufacturing, during the war. Several mills had been erected in the State of New York, and elsewhere, and a large amount of capital (considering the wealth of the country at the time), invested. Upon the close of the war with Great Britain, and the opening of the foreign trade, this interest received a severe shock, and was much embarrassed by excessive importations of foreign goods.

Mr. Lowell, whose profound knowledge of the business and eminent abilities, peculiarly fitted him to impart correct information to others, repaired to Washington, in the winter of 1816; and in confidential intercourse with some of the leading members of Congress, he fixed their attention on the importance, the prospects, and the dangers of the cotton manufacture. The Middle States, under the lead of Pennsylvania, were strong in the manufacturing interest. The West was about equally divided. The New England States, attached, from the settlement of the country, to commercial and navigating pursuits, were less disposed to embark in the new policy, which was thought adverse to some branches of foreign trade, and particularly to the trade with India, from which the supply of coarse cottons was principally derived. The southern States, and particularly South Carolina, then represented by several gentlemen of distinguished ability, held the balance between the rival interests. After a protracted discussion marked by eminent ability on both sides, the South, under the able lead of the late distinguished and lamented John C. Calhoun, gave their influence to the new measure, and the tariff of 1816 was established. This was the first legislative enactment recognizing the existence of the cotton manufacture in this country.

But the earthly efforts of Mr. Lowell were drawing to a close. He died in 1817, at the early age of forty-three. "Few men have accomplished as much to make their names known to advantage and remembered with gratitude," as FRANCIS CABOT LOWELL.

After the passage of the law of 1816, the business continued to increase. Mr. Jackson continued to manage the Waltham Company, and began, as early as 1820, to look around for some new locality where the business might be extended. In 1821, Mr. EZRA WORTHEN suggested to Mr. Jackson that the Pawtucket Canal, at Chelmsford, would afford a fine location for large manufacturing establishments, and that probably a privilege might be purchased of its proprietors. To the comprehensive mind of Mr. Jackson the hint suggested a much more stupendous project,—nothing less than to possess himself of the whole power of the Merrimack river at that place, known as the "Pawtucket Falls." Relying on his own talent and resolution, he set about this task at his own risk; and it was not until he had accomplished all that was material to his purpose, by purchasing the whole stock in the canal, and all the farms on both sides of the river, which controlled the water power, that he offered a share in the project to the proprietors of the Waltham Company and other persons whom it was thought desirable to interest in the scheme. This offer was eagerly accepted. Extensive additions were subsequently made, and in honor of his late lamented friend, the new town was named LOWELL. On the 6th of February, 1822, the purchasers of the above-named property were incorporated as the "Merrimack Manufacturing Company," and vigorous measures were immediately adopted to carry out their plans. The personal superintendence of the business was confided to the late Kirk Boot, Esq. The foundation of the first mill was laid in 1822, and the first cloth produced in November, 1823. Mr. Ezra Worthen was appointed superintendent of the manufacturing department. He barely lived long enough to see the first commencement of the business. He died June 18th, 1824. In 1825, a reorganization of the company took place. It was found that there were mill privileges enough for several independent companies. It was deemed expedient that one company should have charge of the disposal of the land and water-power, and of the furnishing of machinery, without entering into the manufacture of cotton. The necessary acts were passed by the Legislature, giving the privileges above described to the Locks and Canal Company. The price of the shares in this company under the reorganization, was $500 each; the annual dividends were large, and when at last it was thought expedient (about 1845) to close the affairs of the corporation, the stockholders received of capital nearly $1,600 per share.

I cannot at this time, enter into a detailed history of the growth of this place; after the establishment of the Merrimack Company, others soon followed. Its advancement in wealth and all the elements of civilization, has been singularly rapid. In 1826, the population was 2,500, in 1840—20,796; and in 1850 it was 33,385. In 1850, there were nine companies, owning thirty-four factories, engaged in manufacturing cotton goods, employing a capital of eleven million five hundred thousand dollars; with 305,004 spindles, 19,569 looms, besides bleaching, dyeing and printing works, employing 7,524 female and 2,427 male operatives. But I will not go further into the statistics of Lowell—merely adding, that there are manufacturing interests in that city of large amounts, other than cotton. There is however, one other interesting fact. There are two banks for savings in Lowell, one the "Lowell," and the other the "city." The Lowell Bank had on deposit, the first Saturday in November, 1850, from 4,609 depositors, $\$736{,}628\frac{12}{100}$. The City Bank at the same time had on deposit from 615 depositors $\$75{,}970\frac{51}{100}$. The operatives in the mills are the principal depositors in these banks.

Great attention is paid to the physical, intellectual and moral welfare of the inhabitants and operatives in the mills. A large hospital under able management, has been established. There is a valuable library of 7,000 volumes belonging to the city, to which any one can have access by paying fifty cents per annum; and the Lowell Institute, which has for its object the management of a course of lectures delivered every Winter. Excellent schools are also maintained. In 1840, a paper called the "Lowell Offering" appeared, made up entirely of original matter written by the operatives. This periodical has obtained an extensive reputation. In 1844, selections from it were published in England under the significant title of "Mind among the Spindles." In 1845, there were twenty-three regularly constituted religious societies. They have erected twenty-one churches, at a cost of more than three hundred thousand dollars. Connected with these societies, there were over six thousand Sunday school pupils and teachers; all this was accomplished in the short period of twenty-seven years. An unsettled territory has been covered with substantial edifices, mills, stores, churches, blocks of houses, the prosperous homes of nearly 35,000 people. A result highly creditable to the men who took the lead in this enterprise, has been the reward of this liberal display of their wisdom and humanity. Aided and encouraged by these advantages, the morals of the operatives in the factories have been cherished and preserved, and their intellectual and physical energies strengthened and improved. The superior intelligence and efficiency of the operatives at Lowell over those employed in the factories of the old world, is as manifest as it is gratifying.

The intimate connection between a high standard of morality and intellectual and physical efficiency, deserves profound consideration. It may be the turning point in our favor, in our manufacturing rivalry with other nations. It gives me great pleasure to be able to say that Lowell is not alone entitled to this high commendation. The founders of the factories in Rhode Island and Paterson early saw and justly appreciated the value of a high standard of morality among their operatives, and have been unwearied in their efforts to cherish and sustain it. These leading examples have imparted a healthy tone of moral feeling in relation to these establishments as they have been, and still are, extending throughout our country.

It would be gratifying to follow the personal history of Mr. Jackson. It is well worth studying as an example of boldness of conception, great foresight, a perseverance that nothing could check, triumphing over all obstacles, and rising superior to difficulties, blended with the strictest honor and integrity, that always sustained him.

It was through his exertions, that the Boston and Lowell Railroad was undertaken and completed. It was opened for travel in 1835, and soon justified the wisdom of his anticipations. Afterwards, on the death of Mr. Boot, he had the immediate charge of the Locks and Canal Company. During the last few years of his life, he was treasurer and agent of the Great Falls Manufacturing Company, at Somersworth, which owes its success mainly to his able management. His labors and responsibilities were severe, and a gradual prostration of his physical system admonished him that the time was drawing near when his connection with earthly pursuits must cease. He died at his residence in Beverly, the 12th of September, 1847, in the 68th year of his age. The news of his death was received as a public calamity.

During the period above mentioned, whilst manufactures were being firmly established in New England, they were rapidly spreading in other sections of the Union. My limits will only allow me to refer to the earliest establishments in our own State. The first Cotton Factory in New York was built by Doct. Capron, in Oneida Co., about the year 1809. Then followed the Mills of Hudson, Columbia Co., built by Mr. Jenkins; then those of Pleasant Valley, Dutchess Co. and the Matteawan Mills in 1814: about the same time, several mills were erected in Orange county, one at Ramapo, Rockland county, by the Messrs. Pierson; also one at Schaghticoke. The county of Oneida has probably more capital employed in this branch of business than any other in this State. The NEW YORK MILLS in that county, under the management of the Messrs. Wolcotts, enjoy a justly distinguished reputation for the excellence of their goods. These gentlemen are entitled to distinguished credit for their successful efforts to improve and perfect the cotton manufacture. Many other factories have also been erected in other parts of the State. But the capital invested in this branch of industry is much less in New York than in some of the smallest New England States. The manufacture has also spread in Pennsylvania and Maryland, some of the western and many of the southern States; among the latter Georgia takes the lead.

Calico printing was commenced in this country the latter part of the 18th century. As early as 1790 Herman Vandausen, a German, settled in East Greenwich, R. I., and commenced block printing by hand. The cloths printed by him, were mostly of domestic manufacture. He, however, soon gave up the business as unprofitable. About this time also, many cloths were imported from India, and printed in Providence, in the same manner, by foreign workmen who had come to reside there.

Zachariah Allen, ancestor of the present distinguished manufacturers and calico printers of that name in R. I., and who was then largely engaged in the East India trade, was among the first who had India cloths printed in this country. Block printing was also commenced very early in Philadelphia, by an Englishman of the name of Thorpe. Somewhere between 1820 and 1824, Mr. John Thorpe, a nephew of the above-named gentleman, built an establishment for the firm of Crocker and Richmond, at Taunton, Mass. Their first printing was done by hand.

The first cylinder machine for printing calicoes, I believe, was put in operation at this place. The model of this machine, together with some engraved copper cylinders, was imported from England, in 1825, by Wm. J. Breed, now living in Providence, R. I. At the time he made this importation, all such exports were strictly prohibited by the English Government, and it was very difficult even for skillful workmen to get away. The law was however soon altered, when the business made rapid progress. Andrew Robeson Esq., of New Bedford, Mass., was one of the pioneers in this business, and still has, in possession of the family, the first calico-printing machine made in this country. The greatest improvements in this business have been brought from abroad. A machine invented by R. L. Hawes, of Worcester, Mass., has, however, just been completed for a distinguished printer in R. I., for printing 12 colors by one operation, *which has never before been attempted in the world.* I am not informed of the exact amount of calicoes printed in the United States at present; but it is very large, and has nearly superseded foreign importations. Some idea of its increase may be formed from the fact that about 1826, the Merrimack works at Lowell, Mass., which then produced less than one thousand pieces per week, now turn out about ten thousand and five hundred pieces each week. There are some other large establishments in Massachusetts and several in Rhode Island, whose production is nearly or quite equal to this. In New York, New Jersey and Pennsylvania, there are also other calico printing establishments, where the art is carried to a very high degree of perfection.

I will take occasion in this place to notice briefly, a few of the men whose names will be honored when the history of the cotton manufactures of the United States shall be written.

Mr. PAUL MOODY, before mentioned, was born in Newbury, Mass., in 1777, and before the manufacturing enterprise of Messrs. Lowell and Jackson, was in partnership in the manufacturing business with Mr. Ezra Worthen. In 1814, he removed to Waltham, and rendered the most valuable services in starting the first mill at that place, he supplied an important movement in the power loom of Messrs. Lowell and Jackson, to which that machine owed its successful operation. He invented what is called the dead spindle, which was introduced at Waltham, and is now used in many mills in Lowell. The Rhode-Island machinery employ the "live spindle," copied from the English. He invented what is called the "filling frame," which is still in use in Waltham and Lowell. He invented a "governor" to regulate the speed of their wheels, and the first one he made was in successful operation until 1832. With the assistance of Mr. Lowell, he invented the "double speeder," a piece of machinery the celebrated "Dr. Bowditch" declared, "required for its construction the greatest mathematical power of any piece of mechanism with which he was acquainted." Besides the double speeder, the Waltham company patented a "spinning frame" dressing frame, and "warper," all the invention of Mr. Moody. It is an evidence of the great value attached to the services of this gentleman, that when, in 1823, he went to Lowell, taking with him models and mechanics from Waltham, the Company at Lowell paid the Waltham Company as a remuneration, one hundred thousand dollars. He was at the head of the machine shop in Lowell, until the time of his death, July 7th, 1831.

To MR. KIRK BOOT, Lowell was as much indebted for its success as to any other individual. He was there when the first mill was erected, superintending the interest of the Merrimack Company; and was appointed to the agency of the Locks and Canals, upon the reorganization of that Company in 1825. As a man of prompt business habits, of great power to manage men, and to grasp and master extensive and complicated details, rarely has he been excelled. At the same time, by his high sense of honor, his lofty integrity, his quick perception and decided practice of what was right, he had always a hold upon the respect and affections of those he employed. He devoted his services to the Company until his death, which took place the 11th of April, 1837.

Mr. W. B. LEONARD, of New York, who was for a long time connected with the Matteawan Company, has rendered valuable services to the cause of manufactures, both by importing and improving machinery. The loom introduced at Waltham, heretofore noticed, in consequence of being confined to a certain slow speed, did not go into general use, and was succeeded by what is known as the Scotch loom, introduced at Providence, R. I., from abroad by Mr. Gilmour. It remained as introduced till 1827, when important mechanical improvements were made by Mr. Leonard, by which the texture of the cloth was much improved. This loom, as improved, was first introduced into the New York Mills, and continues in use to the present day. The next improvement was a spreading and lapping machine, introduced from England, by Mr. Leonard, then, an improvement on the "railway drawing head," a very valuable one, patented by him in 1833.

The "self-acting mule," came into use in England and Scotland about the time the American manufacturers were turning their attention to making printing cloths. Under the laws of England, it could not be exported; and, as our laws then were, a foreigner could not take out a patent in this country. Many enterprising men went to England for the purpose of bringing out models of this machine; they, however, did not succeed. But Mr. W. A. Leonard went out, *and succeeded*, at great hazard to himself, in bringing it to this country. The model was made of the exact size to fill a traveling trunk, and smuggled into the cabin of the vessel whilst Mr. Leonard and the Captain (by previous agreement) were fighting, for the amusement of the custom-house officers. During the time they were obtaining the model, Mr. W. B. Leonard was at Washington procuring a special law to secure the right of the machine to the inventor. He had prevailed on the committee to make a favorable report; but the final passage of the bill was in much doubt, when an honor-able member of the House, from Kentucky, determined that everything should be done that could possibly benefit his constituents, strongly advocated the passage of the bill, on the ground that his State and the whole West, were as much interested in the improvement of the breed of mules as the North; and he declared, as his "firm conviction, that Kentucky could raise more and better mules than other section of the country." The bill became a law, and the mules were readily bought by the eastern manufacturers; but I am not aware that the breed of mules in Kentucky has been materially improved by the operation!

One of the most ingenious machines ever invented, was produced by AMOS WHITTEMORE, Esq., of Cambridge, Mass., in 1797, for making cards, which, by a simple operation bends, cuts and sticks the card teeth with a cheapness, celerity and perfection before supposed impossible. This machine has been patented abroad, and is the only one ever invented that approximates at all to the desired result.

Among the many artists and mechanics to whom this important manufacture is indebted for its present highly improved condition, Mr. WILLIAM MASON, of Taunton, Mass., stands preëminent. This gentleman is a native of Mystic, Conn., where he was born in 1808. At the age of thirteen he commenced working in a cotton factory. At seventeen he went into a machine shop, where he at once displayed great mechanical genius and powers of invention. He soon perfected an improvement in the power loom for weaving diapers and cloths of that description. The frame known as the "Ring Spinner," invented by John Thorpe, and improved upon by several others, was, nevertheless, inefficient until perfected by Mr. Mason. He saw the advantages of the principle upon which it was intended to operate, and by his inventive genius supplied the defects in its construction, and rendered it a very important and valuable machine, which has now gone into extensive use among manufacturers. But the great invention on which his fame principally rests, is his "SELF-ACTING MULE." The attention of the best mechanics in England and America had long been turned to this invention, and several different machines of this kind had been produced in England. As early as 1838 Mr. Mason gave his mind to it; and after laborious, patient and persevering application, he succeeded in bringing the machine to operate, and about 1839, took out his first patent. About 1843, he took out a second patent for improvements therein, and the machine began to be appreciated and adopted by manufacturers. He has continued to improve upon it, and it is now, probably, as perfect a spinning machine as there is in the world. I have seen more than 33,000 spindles, constructed upon Mr. Mason's principle, operating in one room at the same time, producing the most beautiful yarn, and with such admirable facility and precision as to suggest the idea "of reason and intelligence in the machines themselves." This gentleman, whose rare and unobtrusive modesty is exceeded only by his skill and untiring industry, has made and put in operation upon his principle in the United States, about 600,000 spindles. His superior artistic taste has contributed more to the beauty and just proportion of form of the various machines to which his attention has been devoted, than that of any other artisan. In addition to cotton machinery, he is now engaged in the manufacture of *locomotive engines;* and should he display the same taste and skill in their construction which he has developed in the production of other machinery, the IRON HORSE of the United States will exceed in symmetrical elegance and beauty, that of any other country.

The "Danforth Frame," (or, "Cap Spinner,") was invented by Mr. CHARLES DANFORTH, a native of Bristol county, Massachusetts, and a descendant of one of the old pilgrim families of that commonwealth. He commenced work as a throstle piecer in a cotton factory, as early as 1811, at the age of 14 years, and continued to be employed in operating cotton machinery in its various departments in different establishments in his native State until 1821, when he removed to the State of New York, and was employed about four years by the Mattaewan Company, at Fishkill. In 1825 he removed to Ramapo, Rockland county, New York, where he was employed as superintendent of a small cotton mill, and was acting in that capacity in 1828, when he made this discovery. The superiority of this machine consists in its rapid production of yarn, and it is said that a lower quality of stock can be used to advantage, and at the same time a good quality of yarn produced. The usual speed of the bobbin is 8,000 revolutions per minute, and the product eight hanks per spindle per day of number 20, or in that proportion for other numbers. The ingenious inventor secured a patent in England in 1830, where he put in operation some 15,000 spindles on his plan, and realized a handsome sum for his patent rights. The machine is mentioned with commendation by some of the ablest English writers on mechanics, under the name of the "American throstle." Mr. Danforth has put about 200,000 spindles in operation in this country, on his principle; and I am happy to say of him what cannot be said of all inventors, he has realized a handsome fortune by the fruits of his industry and ingenuity. He is still engaged in business at Paterson, New Jersey.

About the year 1823, Mr. GEORGE DANFORTH, of Taunton, Mass., brother of the inventor of the "Cap-Spinner," invented an important machine called the counter-twist speeder, but generally known as the "Taunton speeder." The double speeder, invented at Waltham by Messrs. Lowell and Moody, was the only one in use in this country, and was so expensive, as to bear with great severity upon manufacturers of small means. The price of the Waltham speeder, with twenty spindles, was $2,400. The counter-twist speeder, invented by Mr. Danforth, was sold for $350, and could do more work than the Waltham machine. This invention, with various modifications, but essentially on Danforth's principle, has gone largely into use in this country and Great Britain. Mr. Dyer, a native of Rhode Island, took out to England Whittemore's card machine, and for many years, monopolized the manufacture of card clothing in England. Mr. Danforth's counter-twist speeder was also placed in his hands, and from these two American inventions he has realized a princely fortune.

Great difficulty had been experienced from the want of a proper machine to prepare the cotton for the cards. A lapping and spreading machine had been introduced from England, by Mr. Leonard; but this machine was not satisfactory. Some other improvements had also been made by others, but they were inefficient. About 1831, Mr. John C. Whitin, of Whitinsville, Mass., seeing the great necessity of a machine for this purpose, turned his attention to the invention of one. After spending about one year in patient investigation, he succeeded in inventing a machine known as "Whitin's Picker and Lapper," which has received the decided approval of manufacturers, and gone into extensive use. He took out letters patent for it, 20th July, 1832.

Before the invention of any machine of this kind, cotton had to be picked by hand, at an expense of about six cents per pound, and the work, even at this price, was imperfectly done. With Mr. Whitin's machine, it can be picked, lapped and prepared for the cards for about one mill per pound. It is unquestionably the best machine for the purpose intended, that has ever been produced. Mr. Whitin, in company with his brothers, under the firm of Paul Whitin & Sons, have a large machine shop and cotton factory at Whitinsville, Mass., and are justly known as business men of great enterprise, unblemished integrity, accomplished machinists, and superior manufacturers.

Among the individuals who by their personal exertions have contributed most largely to the increase of the cotton manufactures of the United States, is the Hon. Charles T. James, of Rhode Island. Although not claiming to be an inventor, he has displayed great skill and tact in bringing out and combining the inventions of others, and has been the great advocate of the application of steam power as a motor for manufacturing purposes. Mr. James commenced learning to make machines in 1826. By the year 1830, he had become thoroughly and practically conversant with all kinds of cotton machinery then in this country, and had built more or less of all kinds of it with his own hands. In 1830–31, he started a cotton mill at Thompson, Conn., and in 1831–32 built the machinery for a mill to spin and weave No. 60, the finest work then ever attempted in the United States. In 1833, rebuilt the Kennedy Mills, so called, at Central Falls, near Pawtucket, R. I. In 1834, commenced overhauling the Providence steam mill for Samuel Slater, Esq. Up to this time, Mr. James was but little acquainted with steam power. He continued in this mill for some time, and made many valuable improvements in the manufacture of fine cottons, and also in the steam engine.

In 1837 and '38, built what is known as the Bartlett Mill No. 1, at Newburyport; in 1840 and '41, erected Bartlett Mill No. 2, at the same place.

In 1843 and '44, built the James Mill, at Newburyport, and the Penn Mill, at Pittsburg. In 1844, '45, '46, and '47, built the Globe Mill, at Newburyport, Conestogo Mill No. 1, at Lancaster, Penn., and the Naumkeag Mills, at Salem, Mass. The latter is one of the largest mills, as a whole, in the United States, and contains over 33,000 spindles. During the last-named period, three other mills were erected under the direction of Mr. James; one in Maine, one in Massachusetts, and the other in Rhode Island. In 1847, '48, '49 and '50 he erected the Charleston cotton mill, Charleston, S. C.; two mills at Fitchville, Conn.; one at Rockport, Mass.; two more at Lancaster, Penn., for the Conestogo Co.; one at Harrisburg, Penn.; one at Reading, Penn.; one at Sag Harbor, L. I.; one at Cannelton, Ind.; and reconstructed two others at Gloucester, N. J.

In 1851, he erected the Atlantic muslin de laine Mill, at Olneyville, near Providence, R. I. This mill was commenced in January, 1851, and is now in full operation.

The whole number of mills planned and erected by Mr. James since he commenced operations, is something over 30, containing in the aggregate nearly 300,000 spindles, and between 7,000 and 8,000 looms. I am informed that the value of the aggregate product of all the mills built or reconstructed by him, is about $8,000,000 per annum. In 1851, Mr. James was elected a member of the "United States Senate" by his native State, and is at the present time a member of that august body.

About the year 1842, Mr. E. B. Bigelow, of Massachusetts, made an important invention for a power-loom for weaving ginghams, and other colored goods. In 1844, a project for weaving checks and ginghams was started; it found immediate favor in Boston, and the stock was readily subscribed. A location was fixed upon, on an unoccupied fall of the Nashua River, at Lancaster. The real-estate was purchased, the work was commenced, and prosecuted with all possible dispatch. The cost of the mill was $\$802,284\frac{16}{100}$, and is producing about 4,500,000 yards of ginghams per annum, of a quality and cost which has nearly driven all similar foreign goods out of the American market. Although the cost of the mill was thought to be high, it had paid a profit up to 1851 of $102,000. Mr. Bigelow has also invented several other valuable and important machines, among which is a power-loom for weaving coach lace, and one for weaving brussels and tapestry carpets. These inventions show high mechanical genius, and place him in the front rank of American inventors.

There are also many other meritorious men who by their inventions and improvements, and skill as superintendents and overseers of factories, deserve special commendation. There has been a series of continual inventions and improvements in machines since they were introduced into this country. A bare enumeration of them would occupy too much time on this occasion. The great capitalists and merchants of Boston and other cities and towns in New England, with clear-sighted and far-seeing sagacity, early discovered the great advantages that would accrue from the introduction of this branch of industry, and lent their powerful aid to its support.

In speaking of labor-saving machinery, there is one thing that is generally lost sight of, and that is, the great merit there has been displayed in inventing the tools which are used to make the machinery with. A visit to a machine shop, where the machines are made, is quite as interesting, as to the factory where they are used. In this department, the Americans stand pre-eminent.

In a report drawn up by the late P. T. Jackson, whom I have previously mentioned, it is stated, that prior to the passage of the act of 1816, there were 11,000,000 lbs. of cotton consumed per annum. There are no data to be relied upon, for continuous quantities spun between 1816 and 1825–1826. Since that time, returns have been annually made. In 1826 and 1827 the quantity spun in the United States, was 103,483 bales, estimated at 330 lbs. each, net of tare, equal to 34,149,390 lbs. From 1828 to 1830, there were embarrassments among the manufacturers and their customers; consequently the consumption was less than might otherwise have been expected, being 43,646,640 lbs. or 126,512 bales of 345 lbs. each; in 1832 and 1833, the quantity reached 194,412 bales of 360 lbs. each; in 1835–'36, it was 236,733 bales; in 1837–'38, 246,063 bales; in 1839–'40, 295,193 bales. In 1841–'42, there was great manufacturing and mercantile distress, and consumption fell off to 267,850 bales. In 1842–'43, it rose to 325,129 bales. In 1844–'45, the amount was 389,006 bales. In the above statement, the quantity manufactured refers to such purchases as are made by our manufacturers from bales brought to exporting ports. But there is a further quantity taken from plantations in the interior to mills in the Western and Southern States, which must be added to the 389,006 bales. It is estimated at 41,000 bales, making 430,006 bales of 410 lbs. each, equal to 176,302,460 lbs. In 1845,–'46, 176,800,000 lbs. This is an increase from 11,000,000 lbs. in 1816 to 1845–'46, of more than sixteenfold in 29 years. In 1847–'48, we took 531,772 bales from the shipping ports, and by an estimate 75,000 from the plantations to the southern and western mills, making

606,770 bales of 420 lbs. net of tare, equal to 254,843,400 lbs. Here is an augmentation of about 45 per cent. in manufactures, in three years. The result of this rapid increase was an over production of goods, consequent low prices, and serious loss to the manufacturers.

Since 1847–'48, the consumption of cotton has been less than in some previous years, owing to the failure of some concerns and the short working of others. In 1849–'50, it was 595,269 bales. In 1850–'51, in consequence of the very general depression in the business, and the high price which cotton obtained, the quantity consumed did not probably much exceed 495,000 bales.

Prior to 1826, there was no separate record kept of the value of cotton goods exported, but it must have been quite small up to that time. Since then the records kept by the treasury department show the declared value of cotton manufactures exported from the United States, to be as follows:

1826,	$1,138,125		1839,	$2,975,033
1827,	1,159,414		1840,	3,549,607
1828,	1,010,232		1841,	3,122,546
1829,	1,259,457		1842,	2,970,690
1830,	1,318,183	Nine months to 30th June.	1843,	3,223,550
1831,	1,126,313	Year ending 30th June.	1844,	2,898,780
1832,	1,229,574		1845,	4,327,928
1833,	2,532,517		1846,	3,545,481
1834,	2,085,994		1847,	4,082,523
1835,	2,858,681		1848,	5,718,205
1836,	2,255,734		1849,	4,933,129
1837,	2,831,473		1850,	4,734,424
1838,	3,758,755		1851,	7,241,205

By this table we learn that the whole declared value of the exports of the manufactures of cotton from the United States, from 1826 to 1851, inclusive, amounts to SEVENTY-SEVEN MILLION, EIGHT HUNDRED AND EIGHTY-SEVEN THOUSAND FIVE HUNDRED AND FIFTY-THREE DOLLARS, ($77,887,553.)

By the census returns of 1850, the amount of capital invested in the different States, with various other interesting statistics (some of which, however, I do not think are correct) in relation to the cotton manufacture, were as follows:

Amount of Capital invested in the COTTON MANUFACTURE *in the United States, and value of the Entire Product, &c., &c., as per the Census of* 1850.

State.	Capital invested.	Bales cotton.	Tons coal.	Value of all raw material.	No. hands employed.		Entire-wages per month.		Average wages per month.		Value of entire product.	Yards sheeting, &c., &c.	Sundries.
					Male.	Female.	Males.	Females.	Males.	Females			
Maine, .	$3,329,700	31,531	2,921	$1,573,110	780	2,959	$22,895	$35,973	$29 35	$12 15	$2 596,356	32,852,556	
N. Hampshire,	10,950,500	83,026	7,679	4,839,429	2,911	9,211	75,713	124,131	25 45	13 47	8,830,619	113,106,247	149,700 lbs. yarn.
Vermont,	202.500	2,243		114,415	94	147	1,460	1,861	15 55	12 67	196,100	1,651,000	53,050 " "
Massachusetts,	28.455,630	223,607	46,545	11,289,309	9,293	19,437	212,892	264,514	23 01	13 55	19,712,461	298,751,392	353,660 " "
Rhode Island,	6,675,000	50,713	13,116	3,484,579	4,959	5,916	92,282	76,656	18 61	12 95	6,447,120	96,725,612	1,902,980 " thr'd & y'n.
Connecticut,	4.219,100	39,483	2,866	2,500,062	2,708	3,478	51,679	41,060	19 08	11 81	4,257,522	51,780,700	950,000 " yarn.
New York,	4,176,920	37,778	1,539	1,985,973	2,632	3,688	48,244	35,699	18 33	9 68	3,591,989	44,901,475	2,180,600 " "
New Jersey,	1.483,500	14,437	4,467	666,645	616	1,096	11,078	10.487	17 98	9 56	1,109.524	8,122.580	2,000,000 " "
Pennsylvania,	4,528,925	44,162	24,189	3,152,530	3,564	4,099	63,642	40,656	17 86	9 91	5,322,262	45,746,790	5,308.561 " "
Delaware,	460,100	4,730	1,920	312,068	413	425	6,326	4,926	15 55	11 59	538,439	3.521,636	533,000 " "
Maryland,	2,236,000	23,325	2,212	1,165,579	1,008	2,014	15,546	19,108	15 42	9 53	2,120,504	27,883.923	46,000 " "
Virginia,	1,908,900	17,785	4,805	828,375	1,275	1,688	12.983	11,791	10 15	6 98	1,486,384	15,640,107	1,755,915 " "
North Carolina,	1,058,800	13,617		531,903	442	1,177	5,153	7,216	11 66	6 13	831,342	2,470,110	2,267,000 " "
South Carolina,	857,200	9,929		295,971	399	620	5.565	5,151	13 94	8 30	748,338	6,563,737	1.348,343 " "
Georgia,	1,736,156	20,230	1,000	900,419	873	1,399	12,725	10,352	14 57	7 39	2,135,044	7,209,292	4,198,351 " "
Florida,	80,000	600		30,000	28	67	900	335	32 14	5 00	49,920	624.000	
Alabama,	651,900	5,208		237,081	346	369	4,053	2,946	11 71	7 98	382,260	3,081,000	790,000 " "
Mississippi,	38,000	430		21,500	19	17	270	101	14 21	5 34	30,500		171,000 " "
Louisiana,													
Texas,													
Arkansas,	16,500	170		8,975	13	18	190	106	14 61	5 88	16,637		81,250 " "
Tennessee,	669,600	6,411	3,010	297,500	310	581	3,394	3,730	10 95	6 42	510,624	363,250	2,326 250 " "
Kentucky,	239,000	3,760	720	180,907	181	221	2,707	2,070	14 62	9 36	273,439	1,003,000	725.000 " "
Ohio,	297,000	4,270	2,152	237,060	132	269	2,191	2,534	16 60	9 05	394,700	280,000	433,000 " "
Michigan,													
Indiana,	43,000	675	300	28,220	38	57	495	386	13 00	6 77	44,200		300,000 " "
Illinois,													
Missouri,	102,000	2,160	1,658	86,446	75	80	820	800	10 94	10 00	142,900		13,260 bales batting.
Iowa,													
Wisconsin,													
California,													
Dist. Columbia,	85,000	960		67,000	41	103	575	825	14 02	8 01	100,000	1,400,000	
Total, .	$74,501,031	641,240	121,099	$34,835,056	33,150	59,136	$653,778	$703,414			$61,869,184	763,678,407	27,873,600 lbs. and bales.

This is the result of the progress of our country in this department of industry in little more than fifty years, mainly brought about by the introduction of labor-saving machinery.

"Our clock strikes when there is a change from hour to hour; but no hammer in the Horologe of Time peals through the universe when there is a change from era to era."* May we not, however, clearly discern in the progress of invention in the last half century, and its devotion to works of usefulness and the arts of peace, the commencement of not only a new, but of a more truly glorious and happy era in the history of mankind.

During the earlier part of the period we have been considering, the fields of Europe were red with the blood of contending armies. If there was a pause in the whirlwind of battle, it was but the pause of exhaustion to gain new strength for renewed contention. This has passed away.

A spectacle new in this world's history has taken its place, the nations of the earth gather together in a gorgeous edifice, new in its architectural designs, appropriately named THE CRYSTAL PALACE, to test the superiority of artistic skill.

The monarch of earth's proudest nation takes the lead in this high festival, giving an earnest that in all coming time, labor and artistic excellence shall bear the palm and receive distinguished honors.

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* Carlyle.

APPENDIX.

CHRONOLOGICAL SUMMARY

OF THE GROWTH AND TRADE IN COTTON, AND OF IMPORTANT INVENTIONS AND IMPROVEMENTS IN ITS MANUFACTURE.

B. C.

440, or about that time, first mention of cotton in history by Herodotus.

63. Cotton awnings first used in the theater at Rome, by Lentullus Spinther.

A. D.

50. Cotton plant extensively known in Egypt and some of the adjacent countries.

800. Cotton used in Greece in the manufacture of paper.

1252. Cotton goods made in Persia.

1280. Manufacture of cotton introduced into China from India.

1298. Cotton used in England for candle-wick.

1368. Cotton used extensively in China.

1430. Fustians first made in Flanders, with a linen warp and cotton weft.

1500. First attempt to introduce cotton goods into England.

1516. The Caffres, in Southern Africa, wore cotton dresses.

1530. The common spinning wheel invented by Jurgen, at Brunswick, in Germany.

1560. Cotton imported into England from the Levant.

1565. First act of British parliament relating to cotton goods.

1582. A mercantile commission sent from England to Constantinople and other parts of Turkey, to learn any secrets in the arts of manufacturing, dyeing, &c.

1589. The stocking frame invented by William Lee.

1590. Cotton cloth brought to London, from Benin, on the coast of Guinea.

1631. Printed calicoes first introduced into London, from India.

1641. Cotton wool imported into England exclusively from the Levant. At this period, all warps were made with linen, and wove with cotton imported from Cyprus and Smyrna.

1644–50. Conquest of China by the Tartars; manufacture of cotton greatly increased in that empire.

1650. Very fine calicoes and muslins made at Calicut, in India, which were whitened with lemon-water.

" Fustians and dimities first introduced into England.

1670. The Dutch loom first used in England.

1676. Calico printing commenced in London. Introduced into England the year before.

1677. Value of India calicoes consumed in England £160,000.

1688. 450,000 lbs. raw cotton, and 1,450,000 lbs. of yarn imported into France from the Levant.

1698. First steam engine constructed and turned to useful purposes, by Savery.

1700. Manufacture of muslins first attempted at Paisley, Scotland.

1701. Value of cotton goods exported from England, £23,000.

1725. Lawns and cambrics first manufactured at Glasgow—James Monteith being the first manufacturer who warped a muslin web in Scotland.

1733. First cotton yarn spun by machinery in England, by Mr. Wyatt.

1734. The Trustees of Georgia were presented with a paper of cotton seed, by Philip Miller, of Chelsea, England.

1735. The Dutch first export cotton from Surinam.

1738. Lewis Paul first took out a patent for a machine for spinning with rollers, invented by John Wyatt.

" The fly shuttle invented by John Kay, of Bury, England.

1742. The first Mill for spinning cotton in England erected at Birmingham. It was moved by asses, was unsuccessful, and the machinery was sold in 1743.

1750. The fly shuttle in general use.

" 3,831,620 lbs. of raw cotton, and 3,381,625 lbs. yarn, imported into France from the Levant.

1753. A cotton reel invented by Mr. Earnshaw.

1756. Cotton velvets and quiltings first made in England.

1760. Warping mill invented. Drop shuttle box invented by Robert Kay. Value of cotton manufactures in Great Britain at this period, £200,000 per annum.

1760. James Hargreaves applied the stock-card to the carding of cotton, with some improvements.

1762. Cylinder cards invented.

1763. Bleaching by the old methods generally introduced in England.

1765. The manufacture of calicoes first attempted in England. Cotton velvets first made at Amiens, in France.

1766. Value of cotton goods made in England, £600,000 per annum.

1767. The spinning jenny invented by James Hargreaves.

1768. The stocking frame applied to the making of lace by Hammond.

1769. Mr. Arkwright, afterwards Sir Richard Arkwright, obtained his first patent for spinning cotton with rollers, and built his first mill at Nottingham. This was driven by horse-power, which proving too expensive, he and his partners built another mill at Cromford in Derbyshire, which was turned by water—hence his spinning machine was called the *water-frame.*

1772. First cotton goods made in England with cotton warps.

" Messrs. Arkwright & Co. successfully attempted the manufacture of calicoes.

1774. Chlorine, or oxymuriatic acid, discovered by Scheele, a Swedish chemist.

1775. The first Provincial Congress of South Carolina recommend to the inhabitants to raise cotton.

1777. Green dye for calicoes introduced by Dr. R. Williams.

1779. Cayenne, Surinam, Essequibo, Demerara, and St. Domingo cotton most in esteem in England.

" The mule for spinning cotton invented by Samuel Crompton.

1780. First cotton mill built in Ireland. In 1824 Ireland had 145,000 spindles.

1781. Brazil cotton first imported from Maranham into England.

1782. A panic created in the cotton market of Manchester, England, in consequence of 7,012 bales of cotton being imported between December and April.

" James Watt obtained his patent for the steam engine. It had come into extensive use, to move machinery, in 1790.

" Some American manufactures of cottons first advertised for sale in Philadelphia.

1783. Surat and Bourbon cotton first imported into England about this time.

" Arkwright's machinery for carding and spinning cotton by steam, first used in Manchester, England.

1784. Arkwright's first patent expired, and a great impulse given to the manufacture of cotton.

" The cotton manufactured in Great Britain this year was 11,280,238 lbs., and valued at £3,950,000.

" Cotton imported into England, in small quantities, from the United States.

" First machine for spinning cotton imported into France, from England, by M. Morin, of Amiens.

1785. Power looms invented by Dr. Cartwright.

" Cylinder printing on cloths invented by Bell, and much improved by Lockett.

" Bleaching first performed with oxymuriatic acid, by Bertholett, in France.

1786. The discovery of bleaching with oxymuriatic acid introduced into Great Britain, by James Watt.

" Mr. Orr, of East Bridgwater, Mass., employed R. and A. Barr, from Scotland, to construct carding, spinning, and roving machines; and the Legislature of Massachusetts, to encourage the machinists, granted them 200 pounds, lawful money.

1787. Thos. Somers, an English midshipman, constructed a model of a spinning jenny in Mass, for which the state government granted him £20. These were the first machines constructed in the United States.

" First machinery to spin cotton put into operation in France.

1787. 108 bales of cotton imported into England from the United States.

" The first cotton factory in the United States was organized this year, at Beverly, Mass, and continued in operation about 15 years, making corduroys, bed-tickings, and cotton velvets. General Washington visited this establishment in 1789.

1789. A mule jenny constructed at Amiens, in France, with 280 spindles.

" Sea island cotton first planted in the U. S., and upland cotton began about this time to be raised for use and exportation.

" Samuel Slater arrived in the United States in November.

1790. Dec. 20th, Samuel Slater started the first machinery for spinning cotton in the United States, at Pawtucket, R. I., constructed on Arkwright's plan. Oct. 15th, 1791, specimens of his first yarn and cloth were sent to the Secretary of the U. S. Treasury.

" First calico printing in the United States commenced with wooden types, by Herman Vandausen, a German, at East Greenwich, R. I.

1791. A society of wealthy individuals, under the auspices of ALEXANDER HAMILTON, were incorporated by the legislature of New Jersey, for the purpose of "*establishing useful manufactures.*" In May, 1792, the manufacturing town of Paterson, N. J., founded by this company. In 1794, their first cotton mill completed, under the superintendence of Peter Colt, Esq., and calico shawls and other cotton goods were printed there. In 1796, the company suspended their manufacturing operations. In 1814, the company revived, and manufactures greatly extended there, by Roswell L. Colt, Esq. In 1822, Mr. John Colt commenced at this place the manufacture of *cotton duck*, with doubled and twisted yarn, without dressing or any kind of sizing.

1792. A self-acting mule invented by Mr. Kelly, of Lanark Mills, Scotland.

1793. The saw-gin for cleaning cotton invented by Eli Whitney, in the United States. His patent dated March 14th, 1794.

" Exportation of cotton from the United States to Great Britain begins to be important.

1797. Amos Whittemore, of Cambridge, Mass., invented his machine for cutting, bending, and setting card teeth.

1798. Tennant's bleaching powders invented, by Mr. Tennant, of Glasgow.

" First cotton mill, with machinery, built in Switzerland.

1799. First cotton-spinning machinery erected in Saxony.

1800. The jacquard, a most ingenious mechanism, to be adapted to a loom for weaving figured goods, invented by M. Jacquart, of Lyons, France. It may be adapted to any common loom, at an expense of about $40.

1800 or 1801. The entire stock of American cotton in Liverpool, *one bag.*

1801. Discharge work in calico printing successfully adopted by Messrs. Peel.

1803. First cotton factory built in New Hampshire.

1805. Power looms widely and successfully introduced into England, after many failures.

" Engraved wooden rollers, used for printing cottons; invented by Barton.

1806. Machine for dressing warps invented by Mr. Johnson, who was then in the employment of Messrs. Radcliff & Ross.

1807. New markets for cotton manufactures opened by the revolutions in Spanish America.

1808. New method of engraving or stamping with dies the cylinders for printing cloth, introduced at Manchester, by Locket. This method of engraving by means of steel dies was *invented* by Jacob Perkins, an American.

1808. William Mason, a skillful artist and inventor of machinery, born at Mystic, Conn.

1809. The first cotton factory in New York built by Doct. Capron, in Oneida county.

" The first power loom invented and patented in the United States by P. C. Curtis, of Oneida County, N. Y.

" Lace machinery much improved by Heathcott.

" British parliament granted Dr. Cartwright £10,000 for his invention of the power loom in 1787.

1810. Public attention drawn to the growing importance of cotton manufactures in the United States by Hon. Albert Gallatin and Tench Coxe, Esq.

1811. Machinery for making bobbin-net patented by John Burn, of England.

" Turkey red first introduced into calico printing by M. Koechlin at Mulhausan.

1813. Discharging Turkey red with acid, in calico printing, patented by Jas Thompson, F. R. S.

" Mr. Metcalfe, from America, sent to India with machines for improved cleaning of cotton.

" The first manufacturing establishment in the world combining all the operations necessary for converting the raw cotton into finished cloth, erected at Waltham, Mass., by Francis Cabot Lowell and Patrick Tracy Jackson, assisted by Mr. Paul Moody, an eminent machinist. The exportation of manufacturing machinery from England being prohibited by law, they contrived their own power looms.

1815. 8 lbs. cotton yarn sent from England to India on trial.

1816. Yarn trade opened between England and the continent.

" The first act of Congress passed having special regard to the growth and protection of manufactures in the United States. (The Tariff of 1816.)

" Cotton consumed by the manufactories in the United States about 11,000,000 lbs. per annum.

1817. Francis Cabot Lowell died, Æ. 43 years.

1818. Cotton averaged about 34 cents per pound—the highest of any year in the U. S. since 1801.

1819. New cotton lands sold very high in the United States.

1820. Steam power first applied with success to lace machinery.

" The first cotton mill erected in Manayunk, Pennsylvania, by Capt. John Towers.

UofM